

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. CONTRACT ID CODE		PAGE OF PAGES 1 2	
2. AMENDMENT/MODIFICATION NO. 0016		3. EFFECTIVE DATE 23 Feb 2004		4. REQUISITION/PURCHASE REQ. NO. W25PHS31710862		5. PROJECT NO. (If applicable)	
6. ISSUED BY		CODE		7. ADMINISTERED BY (If other than Item 6)		CODE	
US Army Engineers, Philadelphia Wanamaker Building, 100 Penn Square East Contracts Branch, Room 643 Philadelphia, Pennsylvania 19107-3390				US Army Engineers, Philadelphia Wanamaker Building, 100 Penn Square East Philadelphia, Pennsylvania 19107-3390 Jennifer McGivern, Contracts Branch 215-656-6773			
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)				(√) 9A. AMENDMENT OF SOLICITATION NO. DACA61-03-R-0009			
				X 9B. DATED (SEE ITEM 11) 07 July 2003			
				10A. MODIFICATION OF CONTRACTS/ORDER NO.			
				10B. DATED (SEE ITEM 13)			
CODE		FACILITY CODE					

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☒ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☐ is extended, ☒ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

DESIGN/BUILD AIR FREIGHT TERMINAL FACILITY, DOVER AIR FORCE BASE, DELAWARE, STEP (PHASE) TWO

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(√)	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☐ is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

THIS AMENDMENT DOES NOT EXTEND THE STEP (PHASE) TWO PROPOSAL DUE OF 05 MARCH 2004 at 1:00 PM.

BE ADVISED THAT ALL TECHNICAL INQUIRIES MUST BE SUBMITTED IN WRITING BY 4 PM FEBRUARY 25, 2004. ANY INQUIRIES RECEIVED AFTER THAT DATE WILL NOT BE ADDRESSED.

(CONTINUED ON NEXT PAGE)

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
15B. CONTRACTOR/OFFEROR		16B. UNITED STATES OF AMERICA	
15C. DATE SIGNED		16C. DATE SIGNED	
(Signature of person authorized to sign)		BY (Signature of Contracting Officer)	

14. DESCRIPTION OF AMENDMENT (continued)

- a. Section 00010 – Solicitation Offer and Award – Delete Section 00010 in its entirety and substitute revised Section 00010 annotated Amendment No. 0016 attached hereto,
- b. Section 00800 – Make the following pen and ink change to SCR-18, paragraph c - Add the following sentence: “The current rate for electricity is 4.11 cents per KWH.”
- c. SPECIFICATIONS:
 - 1) Step 1 Section 01010 – Delete Step 1 Section 01010 in its entirety and substitute Step 1 Section 01010 annotated Amendment 0016, attached hereto.
 - 2) Section 01010 – Delete the following Chapters in their entirety and substitute revised Chapters annotated Amendment No. 0016, attached hereto.
 - a) Chapter D31 (3 pages)
 - b) Chapter D34 (7 pages)
 - 3) Section 01010, Chapter E12, Cover Purchase Description (CPD) - Delete CPD in its entirety and substitute the revised CPD annotated Amendment No. 0016, attached hereto. Also add to the end of the CPD: “Global Air Transportation Execution System (GATES) Development, Maintenance and Support – Interface Design Description (IDD) for the Mechanized Materials Handling System Interface” dated 12 Feb 2004, annotated Amendment No. 0016, attached hereto.
 - 4) Appendix I – Delete the following pages in their entirety and substitute the revised pages annotated Amendment No. 0016, attached hereto.
 - a) A-2, M-1 through M-8, E-3
- d. Please indicate receipt of this amendment on Standard Form 1442 (SOLICITATION, OFFER, AND AWARD) as Amendment No. 0016. Failure to acknowledge all amendments may be cause for rejection of the proposal.

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SECTION 00010 – SUPPLIES OR SERVICES AND PRICES

PRICE SCHEDULE

Item No.	Description	Qty	Unit Price	Amount
BASE				
BID				
0001	All costs in connection with design and design reviews related to the Air Freight Terminal and related design of demolition work, Dover AFB, DE, complete as shown on drawings and as specified except as noted below for items 0001A, 0001B and 0001C. This item includes the design of the common heating and cooling system for the Defense Courier Service, Freight Transfer Facility (FTF) and Cargo Development Facility (CDF).	N/A	LS	\$_____
0001A	All costs in connection with design and design reviews related to the MMHS in the main AFT building.	N/A	LS	\$_____
0001B	All costs in connection with the design and design reviews related to the MMHS in the Outsized Cargo Facility.	N/A	LS	\$_____
0001C	All costs in connection with the design and design reviews related to the Defense Courier Service (DCS) Facility except for shared facilities listed in bid item 0001.	N/A	LS	\$_____
0002	All costs in connection with construction of the Air Freight Terminal, including utilities to points 5 feet outside of the building lines complete as shown on drawings and as specified, except for items 0002A, 0002B, 0003, 0003A, 0004, 0005, 0006, 0007, 0008, 0009, 0010, 0010A, 0010B, 0010C, 0011, 0012, 0013, 0014, 0015, 00016, and 0017.	N/A	LS	\$_____
0002A	All costs in connection with purchase and installation of dock levelers, as shown on drawing A1.01 (Appendix J).	24	\$_____	\$_____
0002B	All costs in connection with purchase and installation of truck levelers, as shown on drawing A1.01 (Appendix J).	2	\$_____	\$_____
0003	All costs in connection with construction of all utilities			

Item No.	Description	Qty	Unit Price	Amount
	beyond points 5 feet outside the building lines, except for communications (see Note below) (except that the underground conduit for communications is part of this bid item) and all site work complete as shown on drawings and as specified, except for items 0004, 0005, 0006, 0007, 0008, 0009, 0009A, 0009B, 0010, 0011, 0011A, 0011B, 0012, 0013, 0014, 0015, 0016, and 0017.	N/A	LS	\$_____
0003A	All costs in connection with purchase and installation of truck levelers for concrete rolling stock loading ramp, as shown n drawing A1.03 (Appendix J).	2	\$_____	\$_____
0004	All costs in connection with purchase, haul and placement of satisfactory structural fill for the main Air Freight Terminal building which includes fill for bid items 0002, 0002B, 0003, 0003A, and 0006.	N/A	LS	\$_____
0005	All costs in connection with removal and disposal of structurally unsatisfactory excavated soil which also includes unsatisfactory soil from bid items 0002, 0002B, 0003, 0003A, and 0006.	N/A	LS	\$_____
0006	Installation of emergency generator.	N/A	LS	\$_____
0007	Demolition of existing buildings and facilities outlined below, except for Item 0008.			
0007A	Demolition of existing Building 504	N/A	LS	\$_____
0007B	Demolition of existing Building 505, Bay 0 and northern section of the Pallet Storage and Racking System and east covered Staging Area	N/A	LS	\$_____
0007C	Demolition of existing Building 510	N/A	LS	\$_____
0007D	Demolition of existing Building 581	N/A	LS	\$_____
0007E	Demolition of existing Building 582	N/A	LS	\$_____
0007F	Demolition of existing Building 583	N/A	LS	\$_____
0007G	Demolition of existing Building 585	N/A	LS	\$_____

Item No.	Description	Qty	Unit Price	Amount
0007H	Demolition of existing Facility 66223	N/A	LS	\$_____
0007I	Demolition of existing Facility 67585	N/A	LS	\$_____
0007J	Demolition of existing Facility 506	N/A	LS	\$_____
0007K	Demolition of existing Facility 521, to include in ground truck scale	N/A	LS	\$_____
0008	Asbestos Abatement			
0008A	Building 504	N/A	LS	\$_____
0008B	Building 510	N/A	LS	\$_____
0008C	Building 582	N/A	N/A	\$_____
0008D	Building 583	N/A	LS	\$_____
0009	All costs in connection with purchase and installation of 2 automated elevated transfer vehicles (ETVs), the ETV storage enclosure, and the storage conveyors, Item no. 0010 includes the roofs, stairs, exterior shells, and the overhead doors for the ETV enclosure. The foundation costs for the following: ETV storage enclosure, ETV storage racks and rail shall be included in bid item 0002.	N/A	LS	\$_____
0009A	All costs in connection with purchase and installation of the staging dock conveyors. The costs for the canopies and foundations associated with the staging dock conveyors shall be included in bid item 0002.	N/A	LS	\$_____
0009B	All costs in connection with purchase and installation of the lifts, the lift conveyors, the lift transfer conveyors, the ALOC/Code J conveyors, the ball transfer conveyor system, and the sortation conveyor system. The costs for the lift pits, and the canopy and foundations associated with the ALOC/Code J conveyors shall be included in bid item 0002.	N/A	LS	\$_____
0010	Demolition of Building 505, Bays 1, 2, 3, 4, 5, associated covered storage areas adjacent to bays on the flight line side of the building, exterior overhead crane to include supporting structure, exterior loading ramp, and the Administrative Area on the truck side of the building.	N/A	LS	\$_____

Item No.	Description	Qty	Unit Price	Amount
0011	Asbestos Abatement, Building 505 Admin Area	N/A	LS	\$_____
0011A	Asbestos Abatement, Building 505, Bays 1, 4, and 5	N/A	LS	\$_____
TOTAL BASE BID AMOUNT				\$_____

OPTIONS

OPTION

#1

00012	All costs in connection with construction of the Outsized Cargo Facility, including the FTF and CDF, common HVAC plant/mechanical room for the FTF, CDF, and DCS; and associated utilities to points 5 feet outside the building lines complete as shown on the drawings and as specified, except for new fill – see item 0014 , and disposal of unsatisfactory soil – see item 0015 , and except for items 0012A , 0013 , 0016, and 0017.	N/A	LS	\$_____
0012A	All costs in connection with purchase and installation of truck levelers, as shown on drawing A1.03 (Appendix J).	2	\$_____	\$_____
0013	All costs in connection with construction of all utilities, associated with the Outsized Cargo Facilities, beyond points 5 feet outside the building lines, except for communications (see Note below) and all site work complete as shown on drawings and as specified and except for new fill – see item 0014 , and disposal of unsatisfactory soil – see item 0015 .	N/A	LS	\$_____
0014	All costs in connection with purchase, haul, and placement of satisfactory structural fill for the outsized cargo facility, FTF, DCS, and CDF which includes fill for bid items 0012 , 0012A , 0013 , and 0016.	N/A	LS	\$_____
0015	All costs in connection with removal and disposal of structurally unsatisfactory excavated soil for the outsized cargo facility, FTF, DSC, and CDF which includes unsatisfactory fill for bid items 0012 , 0012A , 0013 , and 0016.	N/A	LS	\$_____

Item No.	Description	Qty	Unit Price	Amount
TOTAL FOR OPTION #1				
OPTION #2				
0016	All costs, except as noted in items 0012, 0014, and 0015 for the construction of the DCS, and associated utilities to points 5 feet outside the building lines complete as shown on the drawings and as specified.	N/A	LS	\$_____
0017	All costs in connection with purchase and installation of the multi-pallet ETV (MPETV), the multi-pallet storage conveyors, the multi-pallet build-up conveyors, motorized pallet conveyor from FTF and DCS, and the 2 overhead bridge cranes. The costs for the supporting structure for the bridge cranes, the overhead canopy, and the dock/foundation for the oversized cargo area, including the MPETV storage racks and rails, shall be included under bid item 0012 .	N/A	LS	\$_____
TOTAL FOR OPTION #2				
OPTION #3				
0018	Emergency Generator, less installation.	N/A	LS	\$_____

NOTES:

Government will provide communications lines from nearest tie-in to the building. Communications lines will be in AFT contractor furnished buried conduits.

For the DCS, this RFP includes a complete design for a separate structure. The contractor's designer shall use this as a basis for re-design of the DCS as part of a combined structure: Outsized Cargo Facility, FTF, DCS, and Cargo Development Facility (CDF). However, due to the secure nature of the FTF and DCS functions these two facilities will not share toilet and break room facilities, nor with the Outsized Cargo Facility and the Cargo Development Facility (CDF). However, a common heating and cooling system shall serve the DCS, FTF and CDF.

The Army will procure this facility through a selection process in accordance with the provisions set forth in this Request for Proposal (RFP). When a contract is awarded, it will be a "Firm Fixed Price Contract."

The Congress, in authorizing and funding this contract, has established certain cost limitations for the project. The current estimated limit for the complete design and construction of this project, less the automated and mechanized material handling systems, is \$50,000,000. Total includes applicable Option No. 2 bid items And Option No. 3.. The current estimated limit for the automated and mechanized material handlings systems (total for Items 0009, 0009A, 0009B and **0017**) is \$20,000,000. There are no expectations of additional funding. Proposals that exceed this funding limit after evaluating the options may be rejected. Submission of desirable alternative features exceeding the minimum requirements may be considered as long as award can be made with the established funds.

For the DCS, the total cost limit for the design and construction is \$1,320,000.

Any proposal that is materially unbalanced as to prices may be rejected. An unbalanced proposal is one which is based on prices significantly less than the cost for some work and prices which are significantly overstated for other work and can also exist where only overpricing or under pricing exists. A proposal may be rejected if the Contracting Officer determines that the lack of balance poses an unacceptable risk to the Government.

Failure to insert prices for each item, to include bid options in the bid schedule may cause the proposal to be rejected.

STEP 1 SECTION - 01010 STATEMENT OF WORK**1. DESCRIPTION OF PROPOSED CONSTRUCTION**

The New Air Freight Terminal project shall consist of approximately ~~15,100 gross square meters~~ of enclosed cargo processing space (to include drive-in refer unit ~~(186 square meters)~~, Security Vault Cage ~~(111 square meters)~~, MMHS Maintenance Shop ~~(232 square meters)~~, Recouperage/carpenter shop ~~(232 square meters)~~, Mail Room ~~(111 square meters)~~), ~~10,400 gross square meters~~ of covered storage space, ~~3,000 gross square meters~~ of enclosed hazardous material storage space, and ~~4,500 gross square meters~~ of administrative space (to include ~~279 square meter~~ Air Freight Management Offices). See attached floor plan sketch. The building shall be of good quality Type I or Type II construction as defined in the latest edition of the International Building Code, based on size, height and zone of buildings, etc. No asbestos containing materials shall be used in this project. The construction shall be on a site on Dover Air Force Base near Atlantic Street between 8th Street and Eagle Way as shown on the attached site plan sketch. The existing AFT (adjacent to the new AFT site) was severely damaged due to heavy snow in February 2003, is old (circa 1950), and cannot be economically upgraded to meet the current and future needs of the Air Mobility Command (AMC). The existing facility must remain in operation during the construction of the new AFT; therefore, the design shall address a phased approach to provide efficient operation of the facility from minimal activity to peak activity. ~~Initial concept (Design-Builder shall develop the detailed phasing plan) is for Phase 1 to include the import/export bays, household goods areas, supporting Mechanized Material Handling Systems (MMHS) and utilities, demolition (except for the existing AFT). This constitutes about 65% (cost basis) of the new AFT. Once Phase 1 is complete and the Air Force moves operations out of the existing AFT (into the new AFT and selected temporary facilities), Phase 2 will begin: demolition of existing AFT and complete construction of new AFT.~~

The project also includes the demolition of structures to make way for the new AFT to include:

- (1) Marshalling Yard Facility (Building no. 581 – 113sm (1,216sf))
- (2) Mobility Processing Facility (Building no. 582 – 3,800sm(40,855sf))
- (3) Oil/Water Separator and Lift Station (Building no. 583 – 133sm(1,430sf)) (New facility to be constructed at a new site by new AFT design-build contractor using as-builts)
- (4) C-5 Parts Store (Building no. 585 – 677sm (7,289sf))

(5) Ramp Services Office (Building no. 506 – 170sm (1,830sf))

(6) Air Freight Terminal (Building no. 505 – 37,000sm (398,317sf))

(7) Fire Station (Building no. 510 – 1,454sm (15,645sf))

(8) Storage Facility (Building no. 504 – 40sm (436sf))

~~**(9) Material Handling Equipment (MHE) Covered Storage (Building no. 509 – 2,454sm (26,400sf)) (This is an optional bid item. Facility to be disassembled and reassembled at the new AFT site by new AFT design-build contractor)**~~

(10) Outdoor C-5 aircraft wash rack (Facility no. 66223) (New wash rack to be constructed at a new site by the new AFT design-build contractor),

~~**(11) Pavilion (Building no. 67585) (New pavilion to be constructed at a new site by the new AFT design-build contractor using as-builds).**~~

(12) Portions of the new AFT site are located over abandoned concrete with asphalt surface taxiways and runway. These pavements will be removed where necessary as part of the new AFT construction.

Other site information:

~~**(1) Foundation design for purposes of the Step 2 price proposal it is assumed that all soil on site is structurally unsuitable to the depths required for an acceptable foundation structure. Structurally unsuitable soil shall be removed from the Base. The Contracting Officer will award a contract modification to cover the cost of removal and disposal of excess structurally unsuitable soil (excess being defined as beyond what the Design-Build contractor shall determine to be the depth soil shall be excavated based on existing geotechnical data provided in the Step 2 RFP), and shall be responsible for obtaining structurally suitable fill (as with the removed soil, the Contracting Officer will award a contract modification to cover the cost of excess fill). Design-Build contractor shall perform a geotechnical investigation and determine the true soil conditions and a geophysical investigation to determine the presence of any manmade underground structures. The Contracting Officer will award a contract modification to cover the cost to remove of any underground structures not included in the Step 2 RFP.**~~

~~**(2) Soil and groundwater HTRW contamination for purposes of the Step 2 price proposal it is assumed that all soil removed and any groundwater contacted is contaminated with jet fuel. It is also assumed**~~

~~that 25% of the soil (by weight) to be removed is contaminated to hazardous levels. Prior to excavation the Design-Build contractor shall sample soil and groundwater in accordance with local, State, and Federal regulations for contaminants as listed in the Step 2 RFP. All excavated soil and groundwater (removed during dewatering) shall be sampled again in accordance with local, State, and Federal regulations for contamination prior to removal from the Base. Excavated contaminated soil and water from de-watering operations shall be removed from the Base and disposed of in accordance with local, State, and Federal regulations for non-hazardous and hazardous materials. The Contracting Officer will award a contract modification to cover the cost to dispose of contaminated soil and groundwater not listed in the Step 2 RFP or for additional quantities above the quantities listed in the Step 2 RFP.~~

(3) **Asbestos** – Following buildings are known to contain asbestos. Prior to demolition the Design-Build contractor shall perform destructive sampling in the buildings in areas where asbestos containing materials are likely to be present. The Contracting Officer will award a contract modification to cover the cost to remove and dispose of asbestos not listed in the Step 2 RFP or for additional quantities above the quantities listed in the Step 2 RFP.

Building 504

~~Building 505: Roof, Floor Tile, Welding Cloth, Ceiling Tile, Underground Pipes and Pipe Insulation.~~

~~Building 510: Pipe and Tank Insulation in the mechanical room, pipe insulation in the kitchen, floor tile in the foyer, roof.~~

~~Building 582: Pipe Insulation~~

Building 583

~~Building 585: Pipe Insulation and roof.~~

(4) **Lead Based Paint** – ~~for purposes of the Step 2 price proposal it is assumed that all buildings to be demolished contain lead based paint. Contractor is responsible for insuring that demolition workers are not exposed to lead and therefore, shall remove and dispose of lead based paint to the extent necessary to protect demolition workers from exposure.~~

(5) **Other hazards** – mercury (thermostats), freon, and PCBs (in fluorescent light ballasts and in hydraulic fluid) may be present. The Design-Build contractor shall perform investigations to determine quantities present (all fluorescent light ballasts shall be assumed to

contain PCBs). The Contracting Officer will award a contract modification to cover the cost to remove and dispose of hazards not listed in the Step 2 RFP or for additional quantities above the quantities listed in the Step 2 RFP.

COST LIMITATION:

The cost limitation for this project is as follows:

- (1) All Buildings and supporting facilities to include all site and demolition work and utilities to nearest tie-in point (as indicated in the Step 2 RFP) to existing utilities: \$50,297,000**
- (2) Material Handling Equipment: \$20,000,000 (Mechanized Material Handling Systems: Two Manless Elevating Transfer Vehicles (ETVs), a Four Level Pallet Storage System, One Multi-Pallet Elevating Transfer Vehicle with a Two Level Multi-Pallet Train Storage System, one 10 Ton and one 35 Ton Overhead Traveling Bridge Cranes, Staging Dock Conveyors, Pallet Lifts with Scales, Powered and Gravity Roller Conveyor Systems, Truck Dock Equipment (truck and dock levelers)). Note: Pallet rotating system required for all ETVs to accommodate loading of C-17 aircraft.**

Step 2 Price proposals that exceed one or both funding limits may be rejected.

CONTRACT DURATION: 1095 days from Notice to Proceed

2. DESIGN

The project shall be designed and constructed in accordance with the criteria contained herein, in UFC 1-200-01 (Design: General Building Requirements), UFC 3-310-01 (Load Assumptions for Buildings), subsequent Step 2 technical/price Request for Proposal criteria, and using industry standard materials and efficient practices. The building design and the materials selected shall be high quality, durable and easily maintained. The Contractor shall be responsible for the professional quality, technical accuracy and coordination of all designs, drawings, specifications and other documents or publications upon which construction is based.

The objective of this contract is to design and construct the required facilities using the master plan developed for this area. The Contractor shall design and construct the Air Freight Terminal. The building shall be designed and built to comply with the total area requirements and to match the appearance of the adjacent industrial type buildings to include the Mobility Aerial Port Complex.

The design of architectural, interior, structural, mechanical, fire protection, electrical, civil, and other engineering features of the work shall be accomplished and reviewed and approved by engineers, architects, and interior designers registered to practice in their respective professional field in a state or possession of the United States, in Puerto Rico, or in the District of Columbia.

The design shall provide maximum flexibility for distribution of heat, air conditioning, communications, lighting and power, etc. with rearrangements of interior office partitioning to facilitate future changes in missions, personnel and equipment.

The interior systems shall be designed such that the building's private office space is expandable without system relocations. This includes HVAC ducts and registers, lights, electrical and communication outlets, fire suppression system, fire alarm system, and paging and sound masking systems. The layout of the building systems shall be such that all codes are met.

With the exception of reference as-built drawings of existing structures (to be provided with the Step 2 Request for Proposal) to be demolished, which are in English, the project shall be designed in hard metric using the International System of Units (SI).

3. GENERAL SPACE REQUIREMENTS

3.1 Introduction

The Air Freight Terminal will accommodate the efficient, orderly, and safe processing of palletized cargo from the initial receipt of cargo via tractor-trailers through the loading of pallets onboard aircraft. Cargo shall flow through the facility in a logical sequence while meeting current federal safety requirements and fire restrictions. The new technologically advanced facility will provide a work environment where interaction between organizations can be most efficient. The layout, purchasing and installation of the mechanized material handling system (other than vehicles requiring an operator), movable partitions, and the pre-wired workstations shall be the responsibility of the Contractor. The Contractor shall provide design drawings to the Government on AutoCAD. The Contractor shall also provide to the Government specifications and a design analysis.

3.2 Building Description

The New Air Freight Terminal building shall be a steel frame structure without a basement with reinforced concrete foundation and floor slabs (elevated floor slabs for cargo processing bays), masonry exterior, sloped standing seam metal roof, mechanical, electrical (to include emergency generator), communications, fire protection and detection systems. Current DOD antiterrorism/force protection standards for FY04 projects apply as adapted to the specifics of the AFT mission (UFC Criteria: DoD Minimum Antiterrorism Standards for Buildings). Cargo areas are not considered inhabited spaces for the purposes of force protection. All trucks delivering cargo to the facility are inspected before entering the Base and; therefore, are considered to be cleared as possible threats. Therefore, only the minimum force protection requirements apply for inhabited spaces, and the requirement for vehicles to be at least 25 meters from inhabited spaces does not apply regarding trucks delivering cargo to the facility. See attached floor plan.

3.3 Definition of Areas

The following frequently used terms are defined to establish a common understanding.

3.3.1 Net Area (occupiable area) - The gross square meters less building infrastructure and support members such as exterior walls, mechanical spaces, fixed corridors, restrooms, stairwells, janitor closets, vestibules, etc. Physical space that is available for use by the occupant to support the occupant's mission.

3.3.2 Gross Area - all floor area measured from the outer surface of the exterior wall to the outer surface of the exterior wall. Covered (but not enclosed) walks, terraces, balconies and patios shall be counted as one-half of the total square feet. Uncovered walks, terraces, balconies and patios shall not be counted.

4. CODES

Following is a listing of industry standard codes and standards on which the design of this facility shall be based. Industry codes apply except when a published military standard (Such as UFC 3-310-01) is more stringent. Other standards and/or codes, which are industry standard but are not listed may be used provided permission is obtained from the Contracting Officer. All codes and/or standards for the organizations listed below shall be considered as appropriate design criteria and minimum standards of quality and safety. The latest version of the codes in effect on the date of the solicitation shall be used.

Air Conditioning and Refrigeration Institute (ARI) Air Diffusion Council (ADC)

Project Name: Air Freight Terminal

Project Number: FJXT043003
Request for Proposal DACA61-03-R-0009
Amendment 0016

Air Movement and Control Association (AMCA) Air-Conditioning and Refrigeration Institute (ARI)

American Conference of Governmental Industrial Hygienist (ACGIH)

American Gas Association (AGA)

American National Standards Institute, Inc. (ANSI)

American Petroleum Institute (API)

American Society for Testing and Materials (ASTM)

American Society of Heating, Air Conditioning & Refrigeration Engineers, Inc. (ASHRAE):

Refrigeration Fundamentals Equipment HVAC Applications

Ventilation for Acceptable Indoor Air Quality

American Society of Mechanical Engineers (ASME)
American Water Works Assn (AWWA)

American Welding Society, Inc. (AWS)

Americans with Disabilities Act (ADA)

Anti-Friction Bearing Manufacturers Association, Inc. (AFBMA)
Army Materiel Command (AMC) 385-100 Safety Manual

Associated Air Balance Council (AABC)

Automatic Fire Detectors, NFPA 72E

Cast Iron Soil Pipe Institute (CISPI)

Code of Federal Regulations 29 CFR 1910 Code of Federal Regulations 29 CFR

1926 Commercial Item Description (CID)

Cooling Tower Institute (CTI)

Electrical Power Systems for Nonlinear Loads, ETL 1110-3-403

Expansion Joint Manufacturers Assn, Inc. (EJMA)

Project Name: Air Freight Terminal

Project Number: FJXT043003
Request for Proposal DACA61-03-R-0009
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Factory Mutual Engineering and Research Corp (FM)

Hydraulic Institute (HI)

Hydronics Institute (HYI)

International Building Code (IBC)

Illuminating Engineering Society Installation, Maintenance, and Use of
Proprietary Protective Signal System, NFPA 72

Institute of Electrical and Electronics Engineers (Standards), IEEE Instrument
Society of America (ISA)

Life Safety Code, NFPA 101

Lightning Protection Code, NFPA 78

Manufacturers Standardization Society of the Valve and Fittings Industry, Inc

UFC 1-200-01, Design: General Building Requirements

UFC 3-310-01, Load Assumptions for Buildings

UFC 3-600-01, Design: Fire Protection Engineering for Facilities (formerly MIL-
Handbook-1008C)

UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings

National Assn of Corrosion Engineers (NACE)

National Assn of Plumbing-Heating-Cooling Contractors (NAPHCC)

National Electrical Code, NFPA 70

National Electrical Manufacturers Association (Standards), NEMA National

Electrical Safety Code (ANSI C2)

National Fire Codes (NFC)

National Fire Protection Association (Codes), NFPA

National Sanitation Foundation (NSF)

Plastic Pipe Institute (PPI)

Project Name: Air Freight Terminal

Project Number: FJXT043003
Request for Proposal DACA61-03-R-0009
Amendment 0016

Plumbing and Drainage Institute (PDI)

Sheet Metal and Air-Conditioning Contractors National Association, Inc.
(MACNA)

Ten States Standards for Water/Wastewater

Underwriters Laboratories, Inc. (UL) Uniform Building Code (1991)

Uniform Federal Accessibility Standards

Uniform Plumbing Code

5. ATTACHMENTS

Site Map Sketch

Floor Plan Sketch

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CHAPTER D31

ENERGY SUPPLY

PERFORMANCE

A. Basic Function:

1. Provide dual fuel natural gas and No. 2 diesel fuel oil for use by HVAC equipment in accordance with code and as follows. The same No. 2 diesel fuel oil tank(s) that serve as back-up for the boiler(s) shall also serve the emergency generator(s). Tank(s) shall be sized based on the emergency generator requirements found in Chapter 51. The location(s) of the fuel tank(s) shall be in accordance with NFPA 30 and the UFC4-010-01, DoD Minimum Antiterrorism Standards for Buildings.
2. Comply with ICC International Fuel Gas Code-2003.
3. Comply with ICC International Mechanical Code-2003.
4. Substantiation:
 - a. Preliminary Design: Identification of each piece of equipment requiring fuel.
 - b. Design Development: Distribution system and equipment connections shown on drawings.
 - c. Construction: Functional performance testing; proper fuel supply, combustion, and venting.
5. Where energy supply elements also must function as elements defined within another element group, the construction will meet the requirements of both element groups.
6. In addition to the requirements of this chapter, the construction will comply with all applicable requirements of Unified Facilities Guide Specifications and Chapter D3 - HVAC.
7. ***Suggested tie-in point to existing underground natural gas lines: Six-inch natural gas line on Atlantic Street (east side(referring to project North) in the grass area between the curb and the brick wall between 8th Street and 10th Street. There is also a four-inch line on 8th Street (south side(referring to project North)) that reduces to a two-inch line about 150 feet in from Atlantic Street. The two-inch line on 8th Street runs to the vicinity of Building No. 706 which it serves. The six-inch line on Atlantic Street also serves a four-inch line on 10th Street (north side (referring to project North) to the vicinity of Building Number 505 where a two--inch line branches off and enters Building 505 at Bay 0 from the north (referring to project North)). The six-inch line on Atlantic Street increases to a ten-inch line just north (referring to project North) of 8th Street.***

B. Amenity and Comfort:

1. Heating: Provide fuel to all fuel burning equipment that is used to maintain space comfort.
2. Leakage:
 - a. Provide leak-free distribution systems.
 - b. Provide containment of No. 2 diesel fuel oil as required by 40 CFR 280.
 - c. Provide double-wall containment of No. 2 diesel fuel oil distribution system and comply with requirements of 40 CFR 280.
 - d. Monitoring and Leak Detection:
 - 1) Provide tank monitoring as required by 40 CFR 280, by the following methods:
 - a) Inventory control.
 - b) Manual tank gauging.
 - c) Tank tightness testing.
 - d) Automatic tank gauging.
 - e) Vapor monitoring.
 - f) Ground-water monitoring.
 - g) Interstitial monitoring.

- 2) Provide pipe monitoring as required by 40 CFR, by the following methods:
 - a) Automatic line leak detectors.
 - b) Line tightness testing.

C. Health and Safety:

1. System Design Pressure: 125 psig, minimum.
2. Natural Gas System Working Pressure: 1 psig, maximum.
3. Diesel Fuel System Working Pressure: 5 psig, maximum.
4. Natural Gas Entrance into Facility: The construction will locate the service meter at least 10-feet from ignition sources outside of the premises.

D. Structural:

1. Seismic Protection:
 - a. Provide fuel distribution system with the ability to flex where differential movement is anticipated, clearances around piping at walls and floors to allow movement, and valves to stop flow in case of rupture due to a seismic event.
 - b. Provide fuel distribution system supports capable of supporting twice its installed weight.

E. Durability:

1. Expected Service Life Span: Provide a system which will last a minimum of 20 years in service without major repairs or operating expense.
2. Vandalism: The construction will protect~~Protect~~ the service meter from unauthorized access.
3. Accidental Damage: Protect service meter from accidental damage by installing bollards to stop vehicles.
4. Provide locked gated wire cage.

F. Operation and Maintenance:

1. System Capacity: The construction will provide a fuel supply line (pipe) with capacity to serve the facility plus 50 percent reserve capacity.
2. Ease of Use:
 - a. The construction will locate fuel piping system mains in mechanical room.
3. Ease of Service:
 - a. The construction will provide shut-off valves as required by code and at each branch connection.

PRODUCTS

A. Pipe:

1. Use one or more of the following:
 - a. Materials permitted by code.
 - b. Stainless steel pipe with threaded or welded joints.
 - c. Steel pipe with threaded or welded joints.
2. Do not use:
 - a. Copper pipe.
 - b. Aluminum-alloy pipe.
 - c. Ductile iron pipe.
 - d. Plastic pipe.

B. Fittings:

1. Use one or more of the following:
 - a. Materials permitted by code.
 - b. Stainless steel.
 - c. Steel.
2. Do not use:
 - a. Copper.
 - b. Aluminum-alloy.
 - c. Ductile iron.
 - d. Plastic.

END OF CHAPTER D31

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CHAPTER D34**AIR DISTRIBUTION****PERFORMANCE****A. Basic Function:**

1. Distribute air to maintain the required space conditions.
 - a. Special-Purpose Exhaust: See Chapter D3 HVAC.
2. Where air distribution elements also must function as elements defined within another element group, the construction will meet the requirements of both element groups.
3. In addition to the requirements of this chapter, the construction will comply with all applicable requirements of Unified Facilities Guide Specifications and Chapter D3 - HVAC.
4. Do not use humidifiers in administrative areas except for the Computer Operations Section.

B. Amenity and Comfort:

1. Space Temperature Control: Coordination of air distribution system's design and installation with zoning and space temperature requirements specified in specified in Chapter D36 - HVAC Controls.
2. Air Movement:
 - a. Provide an air distribution system that limits the air velocity to 100 fpm, maximum at work stations.
 - b. Adjustments: Provide an air distribution system which allows relocating supply diffusers, adjusting dampers, and changing the thermostat setpoint.
 - c. Substantiation:
 - 1) Occupancy: Measure air movement at work station in accordance with ANSI/ASHRAE Standard 55-1992 with Addendum in areas where more than 10 percent of the occupants are uncomfortable and adjust air distribution system to make occupants comfortable.
3. Acoustical Performance:
 - a. Air Distribution Background Noise: Provide systems which comply with the acoustical requirements.
 - b. Air Distribution Background Noise: Provide systems which comply with the acoustical requirements - Interiors and the following NC Levels as defined in ASHRAE HVAC Applications Handbook, 1999. Do not exceed the sound pressure level for any octave band at the specified noise criteria (NC).
 - 1) Halls, Corridors, and Lobbies: 35-45, neutral.
 - 2) Executive and Private Offices: 25-35, neutral.
 - 3) Conference Rooms: 25-35, neutral.
 - 4) Open Plan Offices: 30-40, neutral.
 - 5) Classrooms: 40, maximum, neutral.
 - 6) Substantiation:
 - a) Design Development: Equipment product data that predicts sound levels for anticipated use.
 - b) Construction: Measurement, record, and report of sound pressure levels in each octave frequency band.
 - (1) Measurement of room sound levels at the center point of the room area.
 - (2) Measurement of room sound levels with ANSI S1.4-1983(R01), Type 1 sound level meters.
 - (3) Measurement of room sound levels with NC sound level.
 - (4) Submittal of procedure for meter calibration.
 - (5) Calibration of meters and then measure room sound levels.

- (6) Result Interpretation:
 - (a) Acceptable NC Levels: Measured sound pressure levels are below the specified dB levels for the given octave band.
 - (b) Remedial Action: Reduction of sound pressure levels which exceed specified dB levels for a given octave band.
 - 7) Computer Room: 35-45, neutral
 - 8) Board Room: 25-35, neutral
 - 9) Lecture Hall: 25-35, neutral
 - 10) Break Room: 35-45, neutral
 - c. Provide equipment with sound ratings which comply with testing and rating requirements of ARI 880-1998.
 - 1) Substantiation:
 - a) Design Development: Equipment acoustical performance data.
 - b) Construction: Tested and rated air terminals.
 - 4. Cleanliness: Provide filtration of the air distributed to the occupied spaces.
 - a. Filter Efficiency: 85 percent arrestance per ASHRAE Standard 52.1-1992.
 - b. Filter Efficiency: 30 percent atmospheric dust-spot efficiency per ASHRAE Standard 52.1-1992.
 - 5. Odor: Provide exhaust to remove odors.
 - a. Toilet Room Exhaust: 75 cfm per water closet or urinal
 - b. Janitors Closet Exhaust: 2 cfm per sq. ft..
 - c. Locker Room Exhaust: 10 air changes per hour.
 - d. Ventilation Exhaust: 4 air changes per hour.
 - 6. Appearance:
 - a. Diffuser Shape: Provide square, round, rectangular, or linear diffusers with dampers.
 - b. Diffuser Face: Provide louvered face diffusers, or perforated plate with dampers.
 - c. Linear Diffusers: Provide two slot linear diffusers with dampers.
 - d. Diffuser Color: Provide diffusers with ceiling matching color or which are off-white.
 - e. Registers: Provide double-deflection blades with dampers.
- C. Health and Safety:
- 1. Bacterial Growth: Do not use humidification equipment due to excessive maintenance and may also cause mold.
 - 2. Electrical Shock Prevention:
 - a. Provide a disconnect switch at each powered induction unit and electric reheat coil and air handling unit.
 - 3. Fire Sources: Provide air distribution elements constructed from incombustible materials.
 - 4. Fire Spread: Provide interlocks to prevent operation or start-up of air distribution elements when fire or smoke detection systems are in alarm condition.
 - 5. Accidental Explosion: Provide ventilation to prevent build-up of explosive gases as follows:
 - a. Uninterruptible Power Supply Room: 10 air changes per hour.
 - b. ~~Special cargo processing area: 10 air changes per hour.~~ See Appendix I
 - 6. Safety:
 - a. Provide ladders, catwalks and platforms conforming to OSHA Standards to permit access to high-mounted equipment.
 - b. access doors of sufficient size to allow for movement in and out of the equipment room.
 - c. clearance around equipment to permit servicing and repair.

D. Durability:

1. Expected Service Life Span: Provide a system which will last a minimum of 10 years in service without major repairs or operating expense.
2. Aesthetic Life Span: Provide units exposed within the occupied space which will not fade, chip, or peel for a minimum of 20 years.
 - a. The manufacturer shall provide a 5-year extended warranty for all components and labor.
3. Exposed Units within Occupied Spaces: Heavy gage, galvanized sheet steel, painted casing.
4. Accidental Damage: Protection of ductwork, air handlers, fans, and condensing units from accidental damage.

E. Operation and Maintenance:

1. Capacity:
 - a. Humidifier: 100 pounds of steam per hour).
2. Operating Parameters:
 - a. Propeller Fans: Do not use propeller fans at static pressure above 1 inch water gage.
 - b. Duct Construction: In accordance with SMACNA HVAC Duct Construction Standards 1995 and NFPA 90A with Addendum No. 1, based on the following:
 - 1) Supply Duct Pressure Class: 2 inches w.g..
 - 2) Return Duct Pressure Class: 2 inches w.g..
 - 3) Outside Air Duct Pressure Class: 2 inches w.g..
 - 4) Exhaust Duct Pressure Class: 2 inches w.g..
 - 5) Transfer Duct Pressure Class: 2 inches w.g..
 - 6) All Ducts Pressure Class: 2 inches w.g..
 - 7) Duct Pressure Class: 2 inches w.g. for ducts between the supply fan and the terminal boxes. All other duct applications 2 inches w.g.
 - 8) Duct Seal Class C for Duct Pressure Class 2 inches w.g.
 - c. Air Velocity: 2000 feet per minute, maximum.
 - d. Maximum Air Velocity:
 - 1) For 2 Inches W.G. Duct Pressure Class: 2000 feet per minute.
 - e. Fans: Match fan pressure characteristics to the air distribution system pressure characteristics including the system effect factors; pressure characteristics based on ANSI/AMCA Standard 210-1999 fan ratings and system characteristics based on engineering calculations.
 - 1) Substantiation:
 - a) Preliminary Design: Identification of the type of fan to be used.
 - b) Design: Calculations showing the air distribution pressure characteristics and data supporting the selection of the fan.
 - c) Construction: Calculations showing the air distribution systems pressure characteristics; AMCA seal and ratings on each fan used.
3. Ease of Use: Provide units with individual controls coordinated with controls specified in Chapter D36.
4. Ease of Cleaning: Provide units with removable access panels to allow cleaning.
5. Ease of Maintenance: Provide HVAC equipment which allows access to and removal of all components.
6. Peak Electrical Demand: Provide a random start relay to prevent simultaneous start-up of all the heat pumps. Coordinate control requirements with Chapter D36 - Controls and Instrumentation.

7. Energy Efficiency:
 - a. Unitary Air-Conditioner Integrated Part Load Value (IPLV):.75, minimum, calculated as specified by ARI 210/240-1994 or ARI 340/360-2000.
 - b. Unitary Air-Conditioner Seasonal Energy Efficiency Ratio (SEER):, minimum, at standard rating conditions specified by ARI 210/240-1994 or ARI 340/360-2000.
 - c. Substantiation:
 - 1) Preliminary Design: EER for proposed equipment.
 - 2) Design Development: Manufacturers published EER for equipment selected for this project.
 - 3) Construction: Equipment with manufacturers name listing EER, type or style, model or serial number, and catalog number.

PRODUCTS

A. Humidifiers:

1. Use the following:
 - a. Electric humidifiers.
2. Do not use:
 - a. Gas-fired humidifiers.
 - b. Ultrasonic fog generation humidifiers.
 - c. Pan humidifiers.
 - d. Jacketed steam humidifiers.

B. Ductwork:

1. Use one or more of the following:
 - a. Galvanized sheet metal duct.
 - b. Steel sheet metal duct.
 - c. Stainless steel sheet metal duct.
 - d. Flexible ducts shall be maximum 4-feet in length.
 - e. Rectangular.
 - f. Round.
 - g. Oval.
2. Do not use:
 - a. Aluminum sheet metal duct.
 - b. Fibrous glass duct.
 - c. Ductboard.

C. Diffusers, Registers, and Grilles:

1. Use the following:
 - a. Steel diffusers.
2. Do not use:
 - a. Aluminum diffusers.
 - b. Stainless steel diffusers.

D. Louvers:

1. Louvers shall be fabricated from galvanized steel.
2. 18 gauge galvanized 1/2-inch mesh screen in removable frame.
3. Louver blades shall be folded or beaded for rigidity and baffled to exclude driving rain.
4. Do not use:
 - a. Steel fan housing with an aluminum propeller.
 - b. Aluminum fan housing with an aluminum propeller.

- c. Steel fan housing with an aluminum centrifugal wheel.

E. Air Filters:

- 1. Use one or more of the following:
 - a. Pleated panel filters (30% efficiency, tested in accordance with ASHRAE 52.1)
 - b. Cartridge filters (80 to 85% efficiency, tested in accordance with ASHRAE 52.1).
 - c. Supply spare filters equipment.
- 2. Do not use:
 - a. Panel filters.
 - b. Automatic roll filters.
 - c. Extended surface filters.
 - d. Bag-type filters.
 - e. Cleanable media filters.

F. Acoustical Attenuator Systems:

- 1. Use one or more of the following:
 - a. Acoustical duct lining.
 - b. Preformed duct lining.
 - c. factory fabricated sound attenuator ducts.
 - d. Sound attenuators (traps).

G. Ductwork Accessories:

- 1. Access doors for air flow measuring, automatic dampers, fire dampers, coils, thermostats and other apparatus requiring service and inspection in the duct systems.
- 2. Fire damper shall conform to the requirements of NFPA 90A and UL555.
- 3. Manual balancing dampers shall conform to SMACNA HVAC Duct Construction Standards, latest edition.

H. Plenums and Casings (Insulated Sheet Metal Panels):

- 1. Plenums and casings shall be fabricated and erected as shown in SMACNA HVAC Duct Construction Standards, latest edition.

I. Insulation:

- 1. Provide thermal insulation as follows:
 - a. Air plenum and all ductwork in equipment rooms rigid board with reinforced aluminum foil (FRK) facing. Joints are sealed with UL181 pressure sensitive tape.
 - b. Supply and return ducts above ceilings with foil-faced ductwrap with vapor barrier ASTM C553.
 - c. Air plenums, ductwork in equipment rooms, all ductwork below and above ceiling the insulation shall be 2-inches thick.
 - d. Relief air ducts above and below ceilings with foil-faced ductwrap with vapor barrier ASTM C553.
 - e. ~~Exhaust air ducts above and below ceilings with foil-faced ductwrap with vapor barrier ASTM C553.~~
- 2. Insulation shall be furnished on equipment below 60 deg. F, including the following:
 - a. Pumps.
 - b. Cold water storage tank.
 - c. Water softeners.
 - d. Cold and chilled water pumps.
 - e. Roof drain bodies.
 - f. Expansion and air separation tanks.

3. Insulation for hot equipment surface (75 deg. F to 400 deg F.):
 - a. Converters.
 - b. Heat exchangers.
 - c. Hot water generators.
 - d. Water heaters.
 - e. Pumps.
 - f. Air separation tanks.
- J. Ductwork Support Systems:
 1. Ductwork supports shall be according to SMACNA HVAC Construction Standards, Metal and Flexible, NFPA shall comply with latest edition.
 2. Seismic ductwork supports shall be in accordance with SMACNA Guidelines for Seismic Restraints to Mechanical System, First Edition 1991.
- K. Dampers:
 1. Use the following:
 - a. Shafts on balancing dampers must pass through both sides of the duct.
 2. Do not use:
 - a. Splitter damper for balancing.
- L. Submittals:
 1. Shop Drawings: Drawings showing equipment layout, electrical connection diagrams, ductwork layout showing location of supports and hangers.
 2. Components and Equipment: Manufacturer's catalog data included with the detail drawings for each item.
 3. Air Balancing Report: Provide air balance report in accordance with NEBB or AABC Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems.
 4. Operation and Maintenance Manuals: Provide six manuals listing step-by-stop procedures required for system startup, operation, shutdown, and routine maintenance.
- M. Air System Equipment:
 1. Fan shall be tested and rated in accordance with AMCA 210. Fans may be connected to the motors either directly or indirectly.
 - a. Use one or more of the following:
 - 1) Steel fan housing with a stamped steel propeller.
 - 2) Aluminum fan housing with an aluminum centrifugal wheel.
 - 3) Steel fan housing with a steel centrifugal wheel.
 2. Centrifugal fans shall be fully enclosed, single-width, single-inlet, or double-width, double-inlet, AMCA pressure class I, II or III, as required for design conditions.
 3. In-line fans shall have centrifugal backward-inclined blades, stationary discharge conversion vanes, internal and external belt guards, and adjustable motor mounts.
 4. Axial flow fans shall be complete with drive components and belt guard, and shall have a steel housing, cast fan wheel, cast or welded steel diffusers, fan shaft and airfoil blades.
 5. Fan shall be propeller type, assembled on a reinforced metal panel with venturi opening spun into panel.
 6. Centrifugal type power wall ventilators - fan shall be direct or V-belt driven centrifugal type with backward-inclined wheel.
 7. Centrifugal type power roof ventilator - fan shall be direct or V-belt driven with backward-inclined

wheel.

8. Propeller type power roof ventilators - fan shall be direct or V-belt driven. Fan housing shall be hinged or movable weathertight, with framed base constructed of aluminum or galvanized steel.
9. Suspended cabinet type ceiling fans shall be centrifugal type, with acoustically insulated housing.

END OF CHAPTER **D34**

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COVER PURCHASE DESCRIPTION
FOR AN
AIR CARGO HANDLING SYSTEM
FOR THE
NEW AIR FREIGHT TERMINAL
AT
DOVER AIR FORCE BASE, DELAWARE

Original Issue DATE: 09 Jan 2004
Amendment 0016

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1. SCOPE

1.1. GENERAL SCOPE

This purchase description (PD) establishes the minimum performance, design, fabrication, installation, orientation, and test requirements for an air cargo handling system for the air freight terminal complex at Dover Air Force Base (AFB), Delaware. The work shall be completed in accordance with this Cover PD, Appendices A through H, and the applicable requirements of the building construction contract. This PD covers all equipment, materials, and labor necessary to complete installation of the system. It also includes performing tests and making adjustments to the system as well as providing classroom and on-the-job instructions to Government personnel.

1.2. DEFINITIONS

1.2.1. ACRONYMS

AFB - Air Force Base
AF - Air Force
AFT - Air Freight Terminal
ALOC – Airline of Communication
COTR - Contracting Officer's Technical Representative
ETV - Elevating Transfer Vehicle
ETV-PSE – Elevating Transfer Conveyor-Pallet Storage Enclosure
LC - Lift Conveyor
LTC - Lift Transfer Conveyor
MPBUC – Multi-pallet Build Up Conveyor
MPETV – Multi-pallet Elevating Transfer Vehicle
MPSC – Multi-pallet Storage Conveyor
MTBF - Mean Time Between Failures
MTTR - Mean Time To Repair
PD - Purchase Description
PLC - Programmable Logic Controller
PSE - Pallet Storage Enclosure
SC - Storage Conveyor
SDC - Staging Dock Conveyor

1.2.2. PALLETS

The system shall handle 463L pallets and multi-pallet trains (463L pallets attached together). References to pallets shall refer to 463L pallets. References to pallet trains shall refer to 463L pallet trains

1.2.2.1. 463L PALLET

The 463L pallet is used to transport air cargo on military aircraft. The 463L pallet consists of an end-grain balsa-wood or redwood core sandwiched between two sheets of aluminum with frames on all sides consisting of extruded aluminum edge rails. Steel tie-down rings are distributed around the perimeter of the pallet to secure nets and to facilitate handling. The entire pallet measures 108 inches wide by 88 inches long by 2.25 inches thick. Cargo on 463L pallets is normally no higher than 96 inches, but may be stacked up to 114 inches high. The pallet has a rated net capacity of 10,000 pounds and weighs approximately 355 pounds. The 463L pallet can be transferred with either edge leading.

1.2.2.2. MULTI-PALLET TRAIN

A multi-pallet train is used to palletize cargo too long to fit on a single pallet. A multi-pallet train consists of two to six 463L pallets attached together in series. The 463L pallets are attached together with two to four connectors. A two-inch gap will exist between the attached pallets except for the connectors. The load capacity of a multi-pallet train is the capacity of the 463L pallet multiplied by the number of pallets in the train. The load on each individual 463L pallet in the train will not exceed 10,000 pounds. Cargo on a multi-pallet train may be stacked up to 156 inches high.

1.2.2.3. PALLET CONDITIONS

The following pallet conditions shall be assumed for all types of pallets.

1.2.2.3.1. NON-FLATNESS

Approximately two-thirds of the maximum possible pallet contact is made with the rollers, a condition that results from the pallet surface being warped. The bottom surface of unloaded pallets can deflect up to 0.31-inch from level. The deflection of loaded pallets varies with specific loading conditions.

1.2.2.3.2. RESTRAINING STRAPS

Cargo restraining straps may hang below the pallet edges. These straps shall not become entangled in structure or transfer elements nor shall they interfere with any sensing or control devices.

1.2.2.3.3. LOAD DISTRIBUTION

Pallet weights range from fully loaded to empty. The center of gravity may deviate by as much as 10 inches from the center of the pallet.

1.2.3. PALLET HANDLING

The following type of Government-furnished equipment is used to handle pallet loads.

1.2.3.1. K-LOADER

A K-loader is a military transporter with a rollerized deck to assist the loading and unloading of pallets between the K-loader and aircraft, forklifts, and staging docks. The rollerized deck may be powered or non-powered, depending on the K-loader model. The K-loader interfaces with the staging dock conveyors at the air freight terminal complex. The K-loader has a platform that can be raised to interface with aircraft. There are four types of K-loaders and different versions of some types due to different manufacturers. The 60K loader can carry up to six 463L pallets weighing up to 60,000 pounds. The 60K-loader weighs about 65,000 pounds and the powered deck can be positioned at all elevations between 39 inches and 222 inches. The 40K-loader weighs approximately 44,000 pounds and can carry up to five 463L pallets weighing up to 40,000 pounds. The rollerized deck of a 40K-loader can be positioned at all elevations from 41 inches to 156 inches. The 25K-loader can carry up to three 463L pallets weighing up to 25,000 pounds. The deck of the 25K-loader can be positioned at all elevations between 38 and 156 inches. The next generation small loader (NGSL) weighs approximately 32,000 pounds and can carry up to three 463L pallets weighing up to 25,000 pounds. The powered deck of the NGSL can be positioned at all elevations between 39 and 225 inches.

1.2.3.2. 10K FORKLIFT

A 10K forklift is a diesel or electric powered, manually operated forklift weighing approximately 23,000 pounds. The 10K forklift is capable of lifting and transporting 463L pallets with loads up to 10,000 pounds. The 10K forklift interfaces with forklift tine cutouts provided on the conveyors.

1.2.3.3. 4K FORKLIFT

A 4K forklift is a powered, manually operated forklift weighing approximately 5,000 pounds and capable of lifting up to 4,000 pounds. The 4K forklift is used to move palletized freight on wooden pallets within the warehouse, to load materials to and unload materials from 463L pallets, and to place empty 463L pallets on and remove empty 463L pallets from the forklift tine cutouts provided on the conveyors.

1.2.4. INBOUND

In general, inbound is the direction of pallet movement from the air side of the facility toward the truck side of the facility.

1.2.5. OUTBOUND

In general, outbound is the direction of pallet movement from the truck side of the facility to the air side of the facility.

1.2.6. STORAGE LEVELS

The lower level of storage is the bottom level of storage conveyors, staging dock conveyors, and lift transfer conveyors along the elevating transfer vehicle (ETV) aisle. The upper levels of storage are defined as the levels 2, 3, and 4 of storage conveyors in the ETV aisle.

2. APPLICABLE DOCUMENTS

The following documents form a part of this PD to the extent specified herein. The issue in effect on the date the solicitation is issued shall apply.

2.1. GOVERNMENT DOCUMENTS

Many Air Force documents are available for download at <http://www.e-publishing.af.mil>.

Many U.S. Army Corps of Engineers documents are available for download at <http://www.hnd.usace.army.mil/techinfo>.

AIR FORCE MANUALS (AFM)

AFM 88-3 Chapters 1 - 15

AFM 88-15 Air Force Design Manual Criteria and Standards
for Air Force Construction

AIR FORCE OCCUPATIONAL SAFETY AND HEALTH (AFOSH)

AFOSH 48-19 Hazardous Noise Program

AFOSH 91-46 Materials Handling and Storage Equipment

AFOSH 127-46 Safety Requirements for Materials Handling Equipment

AFOSH 127-56 Fire Protection

MILITARY HANDBOOKS

UFC 3-600-1 Fire Protection for Facilities, Unified Building code

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) STANDARDS

29 CFR 1910 Occupational Safety and Health Standards,
(General Industry)

29 CFR 1926 Safety and Health Regulations for Construction

US ARMY CORPS OF ENGINEERS TECHNICAL MANUALS

TM 5-810-1 Mechanical Design Heating, Ventilating, and Air
Conditioning

TM 5-815-3 Heating, Ventilating, and Air Conditioning (HVAC)

APPENDICES

Appendix A for Elevating Transfer Vehicles for the New Air Freight Terminal at Dover Air Force Base, Delaware

Appendix B for Multi-Pallet Elevating Transfer Vehicle for the New Air Freight Terminal at Dover Air Force Base, Delaware

Appendix C for ETV-Pallet Storage Enclosure for the New Air Freight Terminal at Dover Air Force Base, Delaware

Appendix D for Bridge Crane System for the New Air Freight Terminal at Dover Air Force Base, Delaware

Appendix E for Pallet Lift System for the New Air Freight Terminal at Dover Air Force Base, Delaware

Appendix F for 463L Pallet Conveyor Systems for the New Air Freight Terminal at Dover Air Force Base, Delaware

Appendix G for Small Package Sortation Conveyor System for the New Air Freight Terminal at Dover Air Force Base, Delaware

Appendix H for Construction for the New Air Freight Terminal at Dover Air Force Base, Delaware

2.2. NON-GOVERNMENT DOCUMENTS

AMERICAN CONCRETE INSTITUTE

ACI 318 Building Code Requirements for Reinforced Concrete

(Applications for copies should be addressed to the American Concrete Institute, 22400 W. 7 Mile Road, Box 19150, Red Fox Station, Detroit MI 48219)

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC M016 Manual of Steel Construction - Allowable

Stress Design, Ninth Edition

(Applications for copies shall be addressed to the American Institute of Steel Construction, Inc., 1 East Wacker Drive, Chicago IL 60601)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A14.3	Ladders - Fixed - Safety Requirements
ANSI A1264.1	Safety Requirements for Workplace Floor and Wall Openings, Stairs and Railing Systems
ANSI B15.1	Safety Standard for Mechanical Power Transmission Apparatus
ANSI B20.1	Safety Standard for Conveyors and Related Equipment
ANSI B29.1M	Precision Power Transmission Roller Chains, Attachments, and Sprockets
ANSI MH29.1	Safety Requirements for Industrial Scissor Lifts
ANSI Z49.1	Welding, Cutting, and Allied Processes, Safety in

(Applications for copies shall be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A36/A36M	Standard Specification for Carbon Structural Steel
ASTM A53	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A123/A123M	Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153/A153M	Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A307	Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
ASTM A325	Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

ASTM A500	Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A513	Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing
ASTM A563	Standard Specification for Carbon and Alloy Steel Nuts
ASTM B633	Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel

(Applications for copies shall be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia PA 19103)

AMERICAN SOCIETY OF CIVIL ENGINEERS

ASCE 7	Minimum Design Loads for Buildings and Other Structures
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(Applications for copies shall be addressed to the American Society of Civil Engineers, 345 East 47th Street, New York, New York 10017-2398)

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE Standard 62	Ventilation for Acceptable Indoor Air Quality
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(Applications for copies shall be addressed to the American Society of Heating, Refrigerating and Air-conditioning Engineers, 1791 Tullie Cir., NE, Atlanta GA 30329)

AMERICAN WELDING SOCIETY (AWS)

AWS B2.1	Standard for Welding Procedure and Performance Qualification
AWS D1.1	Structural Welding Code - Steel
AWS D14.1	Welding Industrial and Mill Cranes and Other Material Handling Equipment, Specification for

(Applications for copies shall be addressed to the American Welding Society, Inc., 550 NW Lejeune Road, P.O. Box 35140, Miami FL 33135)

ANTI-FRICTION BEARING MANUFACTURER'S ASSOCIATION (AFBMA)

AFBMA STD 9 Ball Bearings Load Ratings and Fatigue Life

AFBMA STD 11 Roller Bearings Load Ratings and Fatigue Life

(Applications for copies should be addressed to the Anti-Friction Bearing Manufacturer's Association, Inc., 1101 Connecticut Ave, NW, Suite 700, Washington DC 20036)

CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION (CEMA)

CEMA 401 Roller Conveyors, Non-Powered

(Applications for copies should be addressed to the Conveyor Equipment Manufacturers Association, 932 Hungerford Drive #36, Rockville MD 20850)

CRANE MANUFACTURERS ASSOCIATION OF AMERICA (CMAA)

CMAA 70 Specifications for Top Running Bridge & Gantry Type
Multiple Girder Electric Overhead Traveling Cranes

(Applications for copies should be addressed to the Crane Manufacturers Association of America, 8720 Red Oak Blvd., Suite 201 Charlotte, NC 28217)

ILLUMINATING ENGINEERING SOCIETY (IES)

Lighting Handbook

(Applications for copies should be addressed to the Illuminating Engineering Society of North America, 120 Wall Street, FI 17, New York, NY 10005)

INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS (ICBO)

International Building Code

(Applications for copies should be addressed to the International Conference of Building Officials, 5360 Workman Mill Rd., Whittier, CA 90601-2298)

NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)

NEMA ICS 2 Industrial Control and Systems: Controllers, Contractors,
Overload Relays, Rated Not More Than 2000 Volts AC
or 750 Volts DC

NEMA ICS 6 Industrial Controls and Systems: Enclosures

NEMA MG 1 Motors and Generators

(Applications for copies shall be addressed to the National Electrical Manufacturers Association, 2101 L Street, NW, Washington DC 20037)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 13 Installation of Sprinkler Systems

NFPA 70 National Electrical Code

NFPA 80 Standard for Fire Doors and Windows

NFPA 90A Standard for the Installation of Air Conditioners and Ventilating Systems

NFPA 101 Life Safety Code

NFPA 230 Standard for the Fire Protection of Storage

NFPA 780 Standard for the Installation of Lightning Protection Systems

(Applications for copies shall be addressed to the National Fire Protection Association, One Batterymarch Park, P.O. Box 9101, Quincy MA 02269-9101)

RACK MANUFACTURERS INSTITUTE

RMI 97 Specification for the Design, Testing and Utilization of Industrial Steel Racks - 1997 Edition (including all appendices)

(Applications for copies shall be addressed to the Material Handling Industry of America, 8720 Red Oak Blvd., Suite 201, Charlotte NC 28217-3992)

SOCIETY OF AUTOMOTIVE ENGINEERS, INC. (SAE)

SAE J429 Mechanical and Material Requirements for Externally Threaded Fasteners, Standard

(Applications for copies shall be addressed to the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale PA 15906)

3. REQUIREMENTS

3.1. SYSTEM DESCRIPTION

The air cargo handling system shall be used to build-up, break down, track, store, stage, and transfer air cargo pallets and pallet trains. Refer to Figures 1 and 2. Single pallet outbound cargo will be assembled and built-up on a pallet on the pallet lifts, transferred to the elevating transfer vehicle (ETV), and stored on a storage conveyor (SC). The ETV can then retrieve the pallet and place it on the appropriate staging dock conveyor (SDC) for transfer to a K-loader. Outbound pallet trains will be built-up on the multi-pallet buildup conveyor (MPBUC) transferred to the multi-pallet elevating transfer vehicle (MPETV), and stored on a multi-pallet storage conveyor (MPSC). From the lower lever MPSCs, pallet trains shall then be transferred to a K-loader. Inbound pallets are transferred from a K-loader onto a SDC, transferred to the ETV, and stored on a storage conveyor. Then the pallet will be retrieved by the ETV and transferred to a pallet lift so the pallet can be broken down and the cargo removed. Inbound pallet trains are transferred from K-loaders onto MPSCs, transferred to the MPETV, and then transferred to a MPBUC so the pallet train can be broken down and the cargo removed. A 35 and 10 ton bridge crane shall be used to facilitate buildup and teardown of pallet trains in the MPETV cargo area. The air cargo handling system shall consist of the following components:

3.1.1. ELEVATING TRANSFER VEHICLES

Two elevating Transfer Vehicles (ETVs) shall be provided to transfer pallets between storage conveyors (on any level), the lift transfer conveyors, and staging dock conveyors. The ETVs shall rotate 463L pallets to accommodate the cargo loading configurations of various aircraft. The ETVs shall run on a single rail in the ETV-pallet storage enclosure (PSE). The ETVs shall be as specified in Appendix A and this Cover PD.

3.1.2. MULTI-PALLET ELEVATING TRANSFER VEHICLES

A Multi-Pallet Elevating Transfer Vehicle (MPETV) shall be provided to transfer pallet trains between multi-pallet storage conveyors (on any level) and multi-pallet buildup conveyors. The MPETV shall travel on a 2-rail system in the MPETV cargo area. The MPETV shall provide the weight and center of balance of pallet trains. The MPETV shall be as specified in Appendix B and this Cover PD.

3.1.3. ETV-PALLET STORAGE ENCLOSURE

The ETV- pallet storage enclosure (ETV-PSE) shall provide environmental protection for the ETVs, storage conveyors, and cargo. The ETV-PSE shall consist of a structural frame and foundation supporting the ETVs and the storage conveyors that interface with the ETV. The ETV-PSE shall be a four level system, one lower and three upper levels. The ETV-pallet storage enclosure shall be as specified in Appendix C, Appendix H, and this Cover PD.

3.1.4. BRIDGE CRANE SYSTEM

A 35 and a 10 ton bridge crane shall be used to load/unload cargo between the Multi-pallet buildup conveyors (MPBUCs) and semi-trailer loads. The bridge cranes shall be as specified in Appendix D and this Cover PD. The bridge crane support structure shall be as specified in Appendix D, Appendix H, and this Cover PD.

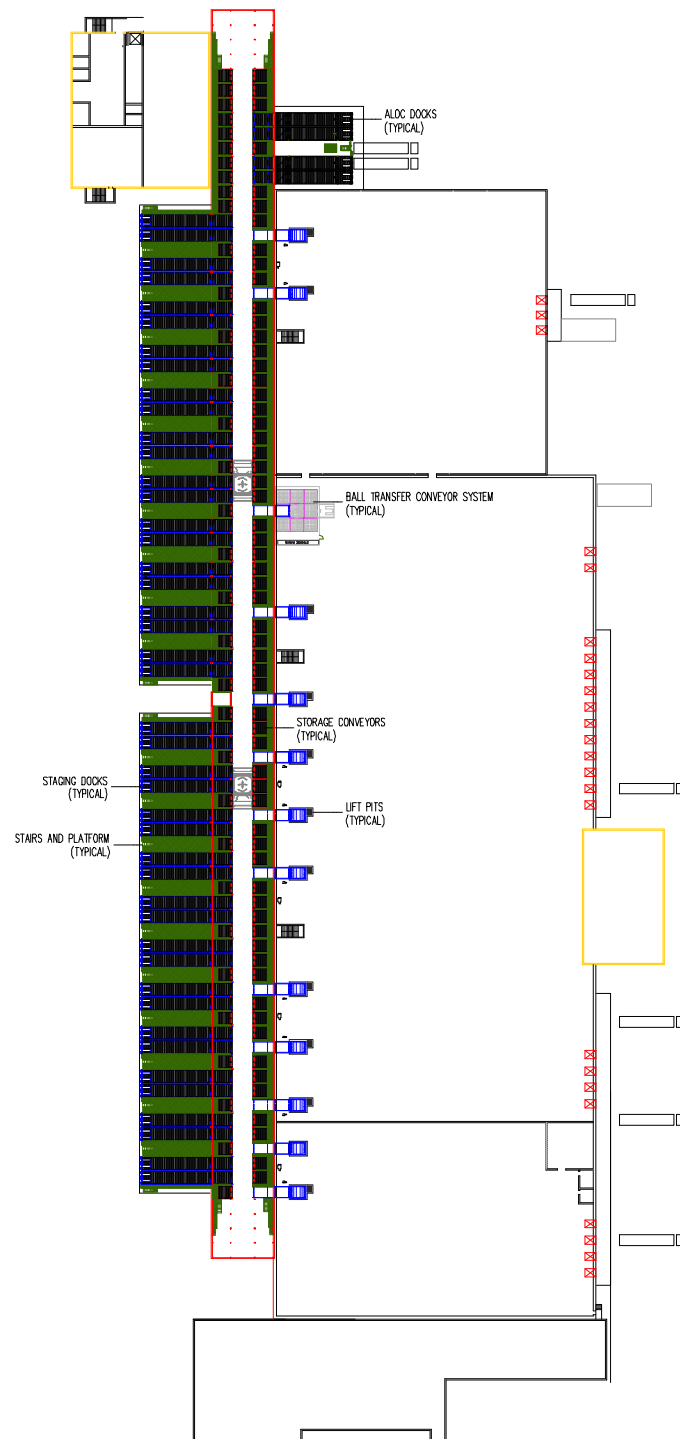


Figure 1, System Layout

3.1.5. PALLET LIFTS

Pallet lifts shall be provided in the air freight terminal to raise and lower 463L pallets to the proper height for easy, convenient, safe, and ergonomic build-up and break down of 463L pallet loads. The pallet lifts shall be as specified in Appendix E and this Cover PD. The pallet lift pit shall be as specified in Appendix E, Appendix H, and this Cover PD.

3.1.6. 463L PALLET CONVEYORS

Ten types of conveyor shall be used to transfer, store, and stage pallets. The conveyor types are: ETV conveyor, storage conveyor (SC), MPETV conveyor, multi-pallet storage conveyor (MPSC), multi-pallet buildup conveyor (MPBUC), lift conveyor (LC), lift transfer conveyor (LTC), staging dock conveyor (SDC), ALOC conveyor, and ball transfer conveyor (BTC). All conveyors shall be as specified in Appendix F and this Cover PD.

3.1.6.1. ELEVATING TRANSFER VEHICLE (ETV) CONVEYOR

The ETV conveyor receives pallets from an interfacing conveyor, stores the pallet during ETV movement, rotates the pallet if required, and then transfers the pallet to another interfacing conveyor. The ETV conveyor is powered and interfaces with the SCs, LTCs, SDCs, ALOC conveyors, and the ~~ball transfer conveyor~~ BTC.

3.1.6.2. STORAGE CONVEYOR (SC)

The SC is a roller conveyor used for storage of 463L pallets. The rollers of all SCs are powered by the extractor on the ETV. SCs only interface with the ETV conveyor.

3.1.6.3. MULTI-PALLET ELEVATING TRANSFER VEHICLE (MPETV) CONVEYOR

The MPETV conveyor receives pallets from an interfacing conveyor, stores the pallet train during MPETV movement, provides the weight and center-of-balance of the pallet train if required, and then transfers the pallet to another interfacing conveyor. The MPETV conveyor is powered and interfaces with the MPBUC and the MPSC.

3.1.6.4. MULTI-PALLET STORAGE CONVEYOR

The MPSC is a powered roller conveyor used to store 463L pallets trains. The MPSC shall be designed to safely store up to a six pallet train with the 108-inch edge leading. MPSCs interface with the MPETV conveyor, K-loaders and forklifts.

3.1.6.5. MULTIPALLET BUILDUP CONVEYOR

The MPBUC is a powered roller conveyor used to store, build-up, and break-down 463L pallets trains. The MPBUC shall meet all requirements for LTCs unless specified

otherwise. The MPBUC shall be designed to safely store up to a six pallet train with the

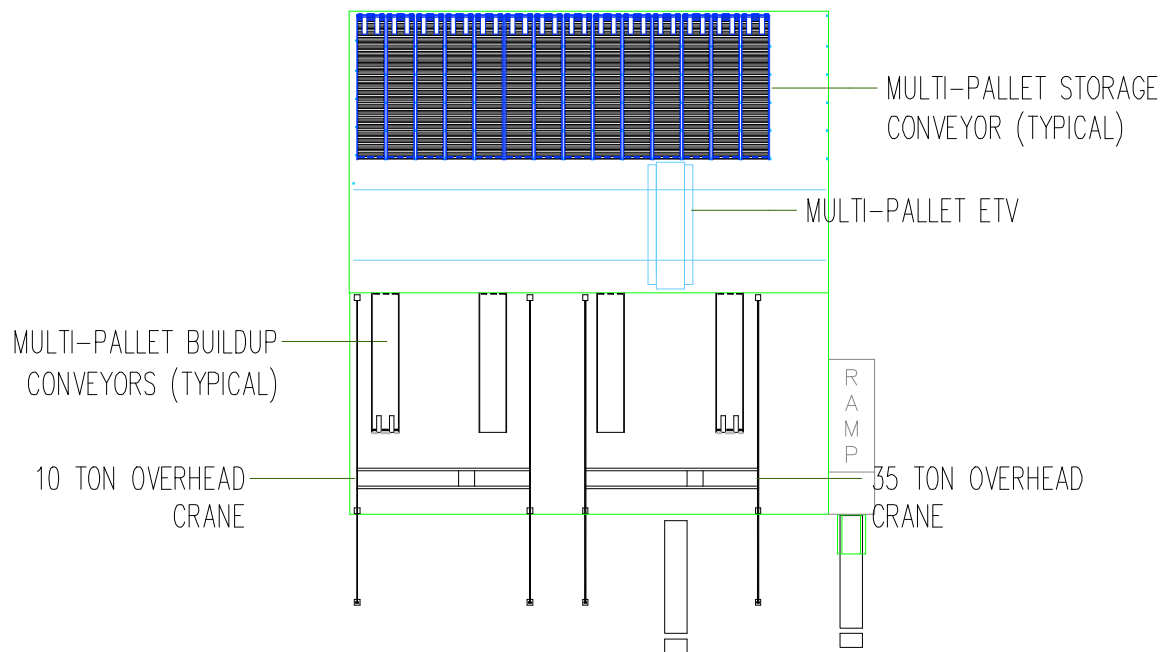


Figure 2, Oversized Cargo Area

108-inch edge leading. The MPBUC is powered and interfaces with the MPETV conveyor, forklifts, and the bridge cranes.

3.1.6.6. LIFT CONVEYOR

The LC stores the pallet during build-up and break down operations. The LC is powered and interfaces with forklifts and the LTC.

3.1.6.7. LIFT TRANSFER CONVEYOR

The LTC is used to transfer pallets between the LC and the ETV. The LTC is powered and interfaces with the ETV conveyor at one end and the LC at the other end.

3.1.6.8. STAGING DOCK CONVEYOR

A SDC stages pallets for transfer between the ETV and a K-loader or forklift. Outbound loads are pre-positioned for quick transfer to a K-loader in the proper order and orientation. Inbound loads are unloaded from the K-loader without waiting for the ETV to receive each pallet individually. SDCs are powered and interface with the ETV conveyor, K-loaders, and forklifts.

3.1.6.9. ALOC CONVEYORS

The ALOC Conveyors consists of four separate conveyor sections; lift conveyor section (LCS), transfer conveyor section (TCS), scale section (SS), and the enclosure section (ES). The ALOC conveyors shall interface with over the road trucks, forklifts, K-loaders, and the ETV conveyor.

3.1.6.10. BALL TRANSFER CONVEYOR SYSTEM

A ball transfer conveyor system shall be used to store and transfer 463L pallets in multiple directions within a freezer. The ball transfer conveyor system shall have three sections; forklift interface conveyor section, freezer ball transfer section, and the transfer conveyor section. The ball transfer conveyor system shall interface with forklifts, and the ETV conveyor.

3.1.7. SMALL PACKAGE SORTATION CONVEYOR

The sortation conveyor shall be used to sort United Partial Services and Federal Express packages to three separate locations. The small package sortation conveyor shall be as specified in Appendix G and this Cover PD.

3.1.8. CONSTRUCTION

Construction requirements for the pallet storage enclosure, conveyor foundations, and other construction-related activities shall be as specified in Appendix H and this Cover PD.

3.1.9. INVENTORY CONTROL SYSTEM

An inventory control system (ICS) shall be provided for the entire mechanized material handling system (MMHS). The ICS system shall interface with the Government's GATES interface being developed to support the new MMHS system located at Ramstein AFB, Germany. **GATES is a worldwide logistical communications network. See the attached draft Interface Design Description (IDD) for information on data communication between the ICS and GATES. The intent is for cargo data to be inputted into GATES via the ICS and for GATES and the ICS to share data. ICS software shall be developed accordingly. Note that this is a draft IDD for use in preparing the proposal. The Government will provide a final IDD to the AFT design-build contract after award of the contract.** The ICS shall not be wireless at any point in the system. The ICS can use hand held devices which are docked to the ICS for transfer of information. **The ICS shall include but not be limited to the following:**

3.1.9.1. ELEVATING TRANSFER VEHICLES

Both ETVs shall be equipped with an ICS terminal. The ICS shall continually and automatically optimize pallet storage for the quickest and most efficient operation.

3.1.9.2. STAGING DOCK CONVEYORS

A minimum of one input terminal shall be provide for every four staging docks or fraction there of.

3.1.9.3. LIFTS

One input terminal shall be provided at each lift location.

3.1.9.4. ALOC DOCKS

One input terminal shall be provided for the four ALOC docks.

3.1.9.5. MULTI-PALLET BUILDUP CONVEYORS

Two input terminal shall be provided for the four multi-pallet buildup conveyors.

3.1.9.6 NON-ELEVATING WORK STATION

One input terminal shall be provided for the non-elevating work station.

3.2. CHARACTERISTICS

3.2.1. NOISE LEVELS

The Contractor shall consider noise levels in the design of the equipment. Hazardous noise shall not exceed 85 decibels A-weighted sound pressure level (dB(A)) for 8 hours

in any 24-hour period or equivalent in accordance with AFOSH 48-19. Noise level measurements will be taken at a three-foot distance from the equipment producing the noise and at a level of five feet above the surrounding surface in all locations where personnel may be present during normal operations. Noise level measurements shall also be taken one foot from the front of all control consoles at a level of five feet above the surrounding surface where the operator stands. If noise levels of installed equipment exceed this requirement, then noise shall be reduced through engineering controls; i.e., insulation, dampening, and isolation.

3.2.2. ELECTRICAL CHARACTERISTICS

The electrical characteristics shall be as follows unless specified otherwise in an appendix:

3.2.2.1. POWER SOURCE

The Contractor shall furnish and install all necessary transformers, wiring, and equipment for power distribution to the system and for control of the system.

3.2.2.2. PANELBOARDS

Power distribution panels (panel boards) with circuit breakers shall be furnished and installed by the Contractor. Panel boards shall not exceed 78 inches in height and shall be mounted so that the height of the top operating handle shall not exceed 60 inches from the floor. Each panel board door shall be provided with a lock and keyed alike. The Contractor shall supply two keys per lock set. Directories shall be typed to indicate load served by each circuit and shall be mounted in a holder behind a translucent protective covering on the inside of the panel door. The function of the panel shall be clearly labeled on the outside of the panel. All panel boards shall be in compliance with Article 384, NFPA 70.

3.2.2.3. INSTALLATION CODE

The installation shall, at a minimum, conform to applicable rules of NFPA 70 (the National Electrical Code).

3.2.2.4. CONDUIT

All wiring shall be encased in rigid metal conduit conforming to Article 346 of NFPA 70; electrical metallic tubing conforming to Article 348 of NFPA 70; or flexible metallic tubing conforming to Article 349 of NFPA 70. If conduit or cables are dropped from overhead, they shall be enclosed in a power pole. No conduit or cable shall run on top of the floor or ground. Exposed conduit shall be installed parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceilings. Exposed conduit and fasteners shall match the color of the walls and/or existing conduit color. Changes in direction of conduit shall be made with symmetrical bends or cast metal

fittings. Field made bends shall be made with the proper hickey or conduit-bending machine. Crushed or deformed conduit shall not be accepted. Conduit shall be rigidly fastened in place at intervals of not more than 10 feet.

3.2.2.5. GROUNDING

Each component of the system shall be properly grounded to ensure safe working conditions. This shall include adequate ground against static charges that may be generated. Grounding shall conform to Article 250 of NFPA 70.

3.2.2.6. FLEXIBLE CONNECTIONS

Flexible connections of short length shall be provided for all motors and for other equipment subject to vibration or movement. Liquid-tight, flexible conduit shall be used in wet and outdoor locations. A separate ground conductor shall be provided across all flexible connections.

3.2.2.7. WIRING

Conductors shall be copper. Wire connectors of insulating material or solderless pressure connectors properly taped shall be utilized for all splices where possible. Soldered mechanical joints shall not be accepted. All wiring shall be color coded, uniquely tagged, or uniquely numbered for identification. Marking shall be applied in such a manner so as to facilitate tracing of wires (circuits) during repairs and maintenance. Minimum control wire size shall be Number 14 AWG. All other wire sizes shall be minimum Number 12 AWG. Wiring and wiring installation shall conform to Article 300 of NFPA 70. All circuits shall be checked for grounds or poor connections prior to being energized.

3.2.2.8. OVERCURRENT PROTECTION

The power distribution panel shall be equipped with circuit breakers and fuses in compliance with Article 240 of NFPA 70. Motors shall be equipped with disconnect switches and thermal overload devices.

3.2.2.9. ENVIRONMENTAL PROTECTION

All enclosures and controls shall be in accordance with NEMA ICS 6, Type 12 if installed indoors and Type 4 if installed outdoors. Components installed inside the air freight terminal shall be considered indoors. All other components, including those installed beneath the building canopies and inside the pallet storage enclosure shall be considered outdoors (i.e., staging dock conveyors, multi-pallet staging dock conveyor, portions of the lift transfer conveyors, ETV including feed rail, enclosure lights and receptacles, etc.). Moisture shall not enter electrical enclosures. All boxes and fittings installed outdoors (as defined above) shall connect through rainproof fittings, Mars Hubs, or equivalent approved by the COTR. Outdoor boxes and panels shall be

oriented vertically such that the cover axis is perpendicular to the ground. Outdoor (as defined above) boxes and panels shall have no conduit entry or other holes on the top surface unless a stainless steel, aluminum or fiberglass protective shield is provided on top of the panel to deflect water away. All electrical enclosures and components installed outdoors (as defined above) shall be sealed with no openings, holes, or gaps. All electrical enclosures and components installed indoors shall be protected such that they will not be harmed by activation of the sprinkler system. No electrical components shall be installed directly on the floor or ground.

3.2.2.10. BACKUP POWER

All components of the system shall operate properly when powered by a back-up generator. After normal power has been removed, all components shall continue to operate properly when powered by a back-up generator. When normal electrical power is restored, all components shall operate properly from the normal power supply. Special procedures shall not be required to restart or operate the system and components shall not require resetting or recalibration when power is switched to or from a back-up generator.

3.2.2.11. PROTECTION FROM MECHANICAL DAMAGE

No push button, control panel, conduit, shielded cable, wire, or electrical device shall be installed so as to expose it to mechanical damage during normal use. If an electrical device, which includes sensors, is exposed to damage by material or personnel, then it shall be guarded. Motor control centers, consoles, conduit, and any non-conveyor and non-control equipment shall be placed along existing walls in out of the way places to eliminate interference with warehouse material and vehicle traffic patterns.

3.2.2.12. MOTORS

Electric motors shall conform to the requirements of NEMA MG-1. Motors shall be of sufficient size for the duty and shall not exceed the full load rating when the driven equipment is operating at maximum capacity under the most severe conditions likely to be encountered. All motor starter overload control relays shall be of the automatically reset-able type except for where it would be unsafe to do so. Unless otherwise specified, all motors shall be totally enclosed. All motors other than non-ventilated motors shall automatically shut off before any damage occurs should the cooling mechanism fail. The operator shall be notified there is a problem with the motor by flashing the power light and the pilot light. All motors shall have continuous duty classification based on 40 degrees Celsius ambient temperature of reference. Motors shall have normal starting torque and low starting current characteristics. The Contractor shall furnish and install all disconnect devices and branch circuit protection to accommodate the equipment installed. Motors and gearboxes shall not overheat or leak fluids.

3.2.2.13. MOTOR CONTROL

Motor controllers and starters shall conform to the requirements of NFPA 70 and NEMA ICS 2. Each motor shall be controlled by its own individual motor starter. Motors of 1/8 horsepower or larger shall be provided with a manual reset thermal-overload protection device, which shall be provided either integral with the motor or controller, or mounted in a separate enclosure. All motors and motor control centers shall be accessible with pallets in any position on the conveyor, the pallet lifts at any elevation, and with the ETVs at any position along the aisle and at any elevation.

3.2.2.13.1. MOTOR CONTROL CENTERS

Lockable motor control centers shall contain combination starters and other equipment as required. Combination starters shall be provided with circuit breakers. Motor circuits shall be protected by circuit breakers. All circuit breakers shall be easily accessible for maintenance. Circuit breakers used for motor circuit disconnects shall be capable of being locked in the open position.

3.2.2.13.2. CONTACTS IN MISCELLANEOUS CONTROL DEVICES

Contacts in miscellaneous control devices such as float switches, pressure switches, and auxiliary relays shall have current and voltage ratings in accordance with NEMA ICS 2 for class B, 300 volt relays.

3.2.2.13.3. MOTOR-DISCONNECT MEANS

Each motor shall be provided with a disconnecting means. Switches shall disconnect all underground conductors. All disconnect means shall conform to NFPA 70, Article 430, Part H.

3.2.2.13.4. PILOT LIGHTS

Each motor control center shall have a green pilot light for each major piece of equipment controlled by the motor control center. When power is available and the equipment is operable, the pilot light shall illuminate. The pilot light shall flash when power is available and an overload, fault, or similar non-operating condition is detected in the motor control center. Each pilot light shall be labeled to show which component the pilot light indicates.

3.2.2.14. DUPLEX RECEPTACLES

Duplex receptacles shall be NEMA type 5-15R rated at 15 amperes, 125 volts, two-pole, three wire, outdoor grounded type with polarized parallel slots, style D series. The receptacles shall provide ground-fault circuit-interrupter protection for personnel safety. Receptacles shall still have power when the equipment they are near is turned off from the motor control center. Power to the receptacles shall be removed only at

the main distribution panel. All receptacles shall be weatherproof. Receptacles shall be mounted in a box with a gasketed weatherproof, cast metal cover plate. There shall be a weatherproof cap over each receptacle opening. The cap shall be permanently attached to the cover plate by a spring-hinged flap.

3.2.2.15. WALL SWITCHES

All wall switches shall be weatherproof. Wall switches shall be mounted in a box with gasketed weatherproof, cast metal cover plate. There shall be a cap over each wall switch. The cap shall be permanently attached to the cover plate by a spring-hinged flap. Switches shall be in compliance with Article 380, NFPA 70.

3.2.2.16. POWER CONDITIONING

The Contractor shall provide and install power conditioning equipment, including phase interrupters, as required for proper operation of all components. Power conditioning equipment shall ensure that no component of the system is damaged, reset, or otherwise affected due to sags, spikes, transients, frequency variations, surges, noise, phase-failure, and other common electrical anomalies. Equipment shall be protected from voltage variations of +/- 10 percent of the normal value. Power conditioning equipment shall protect all electrical components during switch over to and from a back-up generator.

3.2.3. CONTROL CHARACTERISTICS

Controls shall include switches, sensors, displays, actuators, wiring, consoles, enclosures, starters, relays, valves, transformers, amplifiers, pumps, piping, and other required components as are necessary to initiate, terminate, segregate, and otherwise perform the required interrelated functions for all components of the system. Installation of the controls, and all control components, shall be in accordance with 3.2.2. and its subparagraphs. All control voltages shall be maximum 120 volts, single phase. No component shall require manual recalibration, initialization, or other form of human intervention for proper operation following turning off the equipment, switchover to and from a back-up generator, or a power outage. Consoles, sensors, and other control components shall not interfere with pallet transfer. All electrical controls shall conform to the applicable requirements of NEMA ICS 2.

3.2.3.1. CONTROL CABINETS

The Contractor shall install lockable control cabinets which house motor controllers, communications and control wiring, LAN and programmable logic controller (PLC) processor interfaces. All lockable control cabinets in the MMHS system shall be lockable and unlockable with a master key. Four master keys shall be provided with the system. The cabinets shall be installed near the equipment and located such that it shall not interfere with equipment operation and warehouse activities, and shall not block aisles when closed. Cabinets shall not exceed 78 inches in height, and the

height of the top operating handle shall not exceed 60 inches from the floor. The locks of all control cabinets and motor control centers shall be keyed alike and the Contractor shall provide two keys per lock set. Control wiring diagrams shall be provided as part of all drawing submittals, with an extra as-built copy mounted in a plastic case inside the panel door. All components inside the cabinet shall be clearly labeled and shall match the drawings. The function of the control panel shall be clearly labeled on the outside of the panel. All control cabinets and motor control centers with a PLC shall have a duplex receptacle and a light inside the cabinet for maintenance use. Control cabinets and control consoles may be installed as a single unit.

3.2.3.2. CONSOLES

All controls for the individual equipment shall be furnished and mounted in consoles at a suitable height for convenient operation, typically 48 inches above the surface where the operator stands. Controls and consoles shall not obstruct the operator's view of the system and pallets being controlled. All controls shall be securely mounted and placed to avoid damage from vehicles and pallets. In the vicinity of each operator control console shall be a writing surface with sufficient room for a standard clipboard for 8.5 inch x 11 inch paper. The writing surface shall be horizontal or inclined less than 30 degrees from horizontal and shall be located on the right side of the control console. Inclined writing surfaces shall have a lower lip to prevent a clipboard from sliding off. All consoles shall have a kick space a minimum of 4 inches tall so the operator can comfortably use the controls while standing in front of the console. All lights on the console shall flash for 2-3 seconds after receiving power for a bulb check. A special key combination not used during normal operation shall also activate the bulb check so one maintenance person can verify bulb operation without removing power from the console.

3.2.3.3. DEADMAN CONTROLS

Unless specified otherwise, all controls shall be the continuous-contact type, requiring constant pressure for activation. Upon release, continuous-contact controls shall automatically return to the neutral position and the activity initiated by the control shall stop.

3.2.3.4. SINGLE OPERATOR

Unless specified otherwise, all controls and functions shall be operable by one person. All controls shall require less than 10 pounds of force to activate.

3.2.3.5. INTERLOCKS

Control interlocks shall be provided wherever required to ensure safe, efficient, integrated operations as specified. Interlocks shall prevent motors from attempting to drive a component in opposite directions at the same time. Interlocks shall be provided wherever required to preclude unsafe movements and conditions that could endanger

operating personnel or personnel standing near the equipment, or which could damage pallet loads, facilities, or equipment. When controlled by the operator from a console, interlocks shall prevent pallets from coming in contact with each other on all conveyors except the storage conveyors. When controlled by the operator from a console, interlocks shall prevent over travel, malfunctions, and system errors that cause a component to become inoperable, unsafe, or to fail to operate as specified herein.

3.2.3.6. CONSOLE LOCKOUT

Two or more consoles with buttons, switches, or other controls that operate the same equipment shall have a lockout such that when one console is in use, all other consoles controlling that equipment shall be inoperable. The only exception shall be emergency stops which shall always operate regardless of which console is controlling the motion. When a piece of equipment can be controlled by more than one console and the consoles have different settings, the setting of the console that is in use shall be the setting that governs.

3.2.3.7. ENVIRONMENTAL CONDITIONS FOR CONTROLS

All controls shall be designed to withstand, operate, and be safe to use in rain, heat, direct sunlight, wind, moisture, fog, snow, ice, and all other environmental conditions at Dover AFB, Delaware.

3.2.3.8. LABELING

All consoles, panels, and junction boxes shall be clearly labeled to indicate the equipment that is controlled by the enclosure. Labels for each button, joystick, switch, indicator light and all other operator control devices shall be etched aluminum, painted black, and mechanically attached to the console. Adhesive labels shall not be acceptable.

3.2.3.9. DIAGRAMS, CODES, AND DOCUMENTATION

The Contractor shall provide flow charts that clearly illustrate control and operation logic. The flow charts shall be submitted with the shop drawings. Ladder diagrams, flow charts, all variable control settings, and disks containing source code for all control programs shall be submitted with the maintenance manuals.

3.2.3.10. EMERGENCY STOP BUTTONS

All emergency stop buttons shall be illuminated, red, and shall be of the "mushroom" type. Emergency stop buttons shall be the maintained-contact type that are pushed to activate and pulled to deactivate. Activation of an emergency stop button shall override all other control inputs and control logic. Emergency stop buttons shall be hard-wired. Unless otherwise specified, an emergency stop shall be cleared by pulling the emergency stop without having to reset or restart the system. Motors and equipment

shall not automatically activate once the emergency stop has been cleared. Motors and equipment shall immediately cease motion and shall not activate following an emergency stop until the emergency stop has been cleared, sensors indicate the equipment is ready to operate, and the proper control activation is input from a control console. If an emergency stop is activated while a conveyor is in motion, the conveyor shall immediately stop and all pallet stops shall cease movement and remain in position. For equipment with multiple emergency stops, all emergency stops for that equipment shall illuminate when one is activated. The emergency stop that was activated shall be the only emergency stop to flash.

3.2.3.11. SENSORS

Sensors shall be a photoelectric, limit switch, or other device that senses the presence of pallets; detects pallet stop, lift platform, and overhead door positions; detects ETV position and deck height; and similar functions as required for proper and safe operation. Sensors on the staging dock conveyors shall treat multi-pallet trains as single pallets and shall not be fooled by the gap between the pallets. Sensors shall be approved by the COTR at the time of shop drawing submittal. All sensors shall operate in all weather and lighting conditions found at Dover AFB. Sensors shall operate properly in wet, foggy, snowy, icy, and dry conditions, during day and night, and in dusty warehouse, canopied, and outdoor environments. Sensor circuitry shall be totally solid state. Zero speed switches shall not be acceptable.

3.2.3.12. PHOTOEYES

If utilized, photoeyes shall be of a design that precludes improper operation of equipment due to sunlight, lighting, or reflected light from pallets, plastic sheeting, shiny surfaces, and all other objects. The photoeyes shall provide a compatible fail-safe signal that indicates when the beam is made or interrupted. The light source shall be equipped with a lens of the proper diameter to provide the required range of operation. The LED shall have an anticipated life of not less than 100,000 hours. The sensitivity of the detector shall be adjustable. An externally visible alignment LED shall be provided. The photoeyes shall be rigidly mounted so that transmission of vibrations is minimized. The mounting device shall be a standard commercial bracket. Single point attachment shall not be permitted. The photoeyes shall be located in a position that allows for ease of inspection and maintenance. Use of photoeyes in outdoor locations subject to snow, ice, fog, and blowing dirt shall be minimized.

3.2.4. PROGRAMMING TERMINAL AND SOFTWARE

A notebook computer with programming software, manuals, cables, and other hardware, software, and documentation necessary to program each PLC in the system shall be provided. The programming software shall use a graphical user interface and shall be easy to use. All software required to operate the programming software shall be provided and shall be licensed to the Government. The notebook computer and software shall be approved by the COTR with the equipment shop drawings prior to

procurement. If a single computer or software program is not able to program all PLCs provided, then multiple computers and programs shall be provided. ~~The computers and software programs shall be provided as part of the components requiring the hardware and software.~~

3.2.4.1. MMHS PROGRAMMABLE LOGIC CONTROLLERS

Allen-Bradley series 500SLC 5/05 processors with Ethernet capability are preferred. Equivalent controllers are acceptable as approved by the COTR.

3.2.4.2. REMOTE COMMUNICATIONS

Communications shall be provided from all SLC/PLC's to the MMHS repair facility located in the Air Freight Terminal.

3.2.5. SPARE PARTS AVAILABILITY

The manufacturer of the PLC, motors, drives, controls, and other critical components shall have a service center or authorized distributor in Delaware, or the Philadelphia metropolitan area.

3.3. DESIGN AND FABRICATION

3.3.1. DESIGN CRITERIA

3.3.1.1. RELIABILITY AND AVAILABILITY

Each component of the system shall demonstrate a mean time between failure (MTBF) and availability greater than or equal to that listed in Table 1. A failure is defined as any condition that does not conform to the specification or any interruption that causes corrective maintenance to be made to the system. Failures also include situations requiring the use of the maintenance mode on the ETV or MPETV, requiring the use of maintenance personnel, and situations requiring the resetting or restarting any component. The operating time shall be based on the hours listed in Table 1 or the actual hours read from the hour meter. Each individual component shall meet the MTBF and availability requirements specified (i.e., each staging dock conveyor must meet the MTBF and availability requirements). The following formulas will be used to calculate MTBF and availability.

$$\text{MTBF} = \frac{\text{Operating}}{\text{Total}}$$

$$\text{Mean Time to Repair (MTTR)} = \frac{\text{Total Repair}}{\text{Total}}$$

$$\text{Availability} = \frac{\text{MTBF}}{(\text{MTBF} + \text{MTTR})}$$

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TABLE 1 - RELIABILITY AND AVAILABILITY TABLE			
Equipment*	Operating Time (Hours)	MTBF (Hours)	Availability (%)
ETV including ETV conveyor	Hour meter	20	97
Storage conveyor	720	360	99
MPETV including MPETV conveyor	Hour meter	20	97
Multi-pallet Storage conveyor	720	360	99
Multi-pallet Build Up Conveyor	720	360	99
Pallet lift including lift conveyor	720	240	99
Lift transfer conveyor	720	360	99
Staging dock conveyor	720	360	99
ALOC conveyor	720	360	99
Ball Transfer Conveyor System	720	360	99
10 Ton Bridge Crane	720	360	99
35 Ton Bridge Crane	720	360	99
*Each component includes all controls and electrical connections for that component.			

3.3.1.2. MAINTAINABILITY

The system shall be designed, fabricated, and installed to facilitate maintainability and ensure a minimum service life of 15 years. The design shall provide for modular assembly of components and subassemblies where feasible to permit repair or replacement of parts in a minimum of time. This shall include plug-in electrical connections for major electrical subassemblies.

3.3.1.3. ENVIRONMENTAL CONDITIONS

All system components shall operate in a temperature range of -20 to 110 degrees Fahrenheit with up to 99 percent relative humidity. All system components located outdoors or under canopies shall be constructed for year-round outdoor use, operating in an environment consisting of sun, rain, fog, snow, ice, high humidity, and wind. All system components located outdoors, near exterior doors, or under canopies shall be

designed to not trap precipitation. Drain holes, cutouts, sloped surfaces, and drain passages shall be provided to eliminate water accumulation, standing water, and ponding. All system components located inside the air freight terminal shall be constructed to operate in an open warehouse environment.

3.3.1.4. STANDARD, COMMERCIAL COMPONENTS

Standard, commercial components which have been for sale and available for purchase to the general public or government agencies for at least one year shall be used to the maximum extent possible. If requested by the COTR, the Contractor shall furnish evidence that equipment of approximately the same design as that proposed to be installed has been tested and successfully operated. Where two or more units of the same type of equipment are required, these units shall be products of the same manufacturer. All equipment and materials shall be new.

3.3.1.5. STANDARDIZATION

Mechanical and electrical interchangeability shall exist between like assemblies, subassemblies, and replaceable parts regardless of the manufacturer's supplier. Interchangeability does not necessarily mean complete identity, but requires that a substitution of such like-assemblies and replacement parts be easily effected without physical or electrical modifications, including cabling, wiring, and mounting.

3.3.1.6. SPECIAL TOOLS

Use of special tools shall be minimized and, where required for operational adjustments, shall be securely mounted within the equipment in a readily accessible location. Standard tools, fittings, lubricants, and fluids shall be used to the maximum practicable extent.

3.3.1.7. ACCESSIBILITY

Structural members shall not prevent access to or removal of components for repair or replacement. Equipment shall be designed for rapid and easy removal as well as replacement or repair of malfunctioning units, by one individual where feasible.

3.3.1.8. LUBRICATION REQUIREMENTS

Mechanical components shall be designed to permit lubrication of components without disassembly. The type and frequency of lubrication shall be specified on an instruction plate mounted near the lubrication point.

3.3.1.9. STRUCTURAL AND SEISMIC REQUIREMENTS

The system shall be designed and constructed in accordance with design codes applicable at Dover AFB. The system shall be designed to withstand seismic zone 1 conditions. A registered professional engineer experienced with seismic zone 1 requirements shall certify all seismic calculations. All mechanical and electrical components shall be designed and installed to withstand seismic activity. Vibration isolation devices and bracing shall be used as necessary to meet this requirement.

3.3.1.10. OZONE DEPLETING SUBSTANCES (ODS)

The Contractor shall not use or prescribe to the greatest extent possible any ODS in the installation and maintenance of the system. ODS includes, but is not limited to aerosol cans, certain cleaning solvents, refrigerants, and certain lubricants. If there is a question pertaining to the applicability of a substance, submit the name of the substance to the Contracting Officer for verification.

3.3.1.11. SAFETY

The Contractor shall consider the safety of personnel and equipment when designing and installing the system. Safety provisions shall be incorporated to the maximum extent possible. When possible, hazards shall be eliminated through design. When this is not possible, safety devices such as guards, interlocks, and barriers shall be installed. If this does not eliminate the hazard, warning devices such as warning signs, indicator lights, and audio devices shall be installed. Safety requirements shall include, but are not limited to, the following:

3.3.1.11.1. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

The system installation practices and completed system shall meet all applicable requirements of OSHA 29 CFR 1910 and OSHA 29 CFR 1926.

3.3.1.11.2. PROTECTION AGAINST MOVING PARTS

Moving parts shall be provided with guards to protect personnel from possible injury. Guards shall be in accordance with ANSI B15.1.

3.3.1.11.3. PLACARDS

Conspicuous placards shall be mounted adjacent to areas where hazards may exist (i.e., high voltage, pinch points, and tripping hazards). Placards shall also be used to identify operating limits (i.e., capacity, speed, and incline) in a conspicuous location for operators' use. All areas with operating controls shall be identified by placards as "No Drinking, Eating or Smoking" areas.

3.3.1.11.4. FAIL-SAFE CONTROLS

No controls shall cause false operation or endanger personnel if a part should fail. No damage or destruction of any component shall result from reduced voltage or complete loss of power.

3.3.1.11.5. CONVEYOR SAFETY STANDARDS

Conveyor design, components, and controls shall conform to ANSI B20.1.

3.3.1.11.6. AFOSH STANDARD

The system shall conform to AFOSH 127-46.

3.3.1.11.7. PERSONNEL PATHWAYS

The Contractor shall be cognizant of personnel pathways throughout the system and shall provide safe pathways for personnel. Pathways include components that may be stepped on to make an elevation change of less than 36 inches. All areas not meant for personnel traffic shall have signs, barriers, or other means to prevent access. The top of all side guides, chain guards, forklift tine cutouts, structural members, and other horizontal surfaces likely to be used as a pathway by personnel shall have a non-slip surface for safety. Electrical components and other surfaces not designed for personnel traffic shall not be placed in pathway locations. The maximum elastic deflection of any pathway component shall not exceed 0.25 inch under a 250-pound load. All free spinning rollers retractable stops, and other dangers to personnel walking through the system shall be marked. The marking shall consist of painting "NO STEP" on the hazard when possible, painting the hazard yellow or red, or other precautions as appropriate. Conduit and other tripping hazards shall not be placed across personnel pathways.

3.3.1.12. STAIRWAYS

Stairways shall be made of rigid steel and shall support a 250-pound person without any component exhibiting elastic deflection greater than 0.12 inch or permanent deformation. Stair treads and stair landings shall be open grating providing high traction even when wet. Stair treads shall be a minimum of 8.5 inches deep by 30 inches wide. Stair treads shall be vertically spaced 9 inches +/- 2 inches apart and the spacing shall be constant for each stairway. Handrails shall be provided on both sides of the treads and on all open sides of the landings. Handrails shall be minimum 1.25 inches in diameter and shall be supported on maximum 5-foot centers. Handrails shall withstand a minimum load of 200 pounds applied in any direction on the top rail without permanent deformation or damage. Handrails along the stair treads shall be 32 inches +/- 2 inches above the stair tread surface. Handrails on landings shall be 42 inches +/- 2 inches above the landing and shall include a mid-rail. Handrails shall be securely fastened in place. Stairways shall be bolted in place if removal of the stairway is required for maintenance access. Stairways shall not interfere with the transfer or

storage of pallets or the operation of any component. Stairways shall be designed and constructed in accordance with OSHA 1910.24 and ANSI A1264.1.

3.3.1.13. LADDERS

Ladders shall be made of rigid steel and shall support a 250-pound person without any component exhibiting elastic deflection greater than 0.12 inch or permanent deformation. Ladder rungs shall be a non-skid surface. Ladder steps shall be 12 inches +/- 0.50 inch on center, starting from the lower level and continuing to the upper level. Ladders shall be a minimum of 24 inches wide. The centerline of each ladder step shall be a minimum of 10 inches from any obstruction behind the ladder. The step supports shall serve as the handrails. The top of the handrails shall be 42 inches +/- 2 inches above the upper level and shall be blunt at the end. A safety chain with a latchable hook shall be provided between the top of the handrails. The chain attachments shall not encroach upon the ladder opening. Ladders shall not interfere with the transfer or storage of pallets or the operation of any component. Ladders between levels more than 15 feet apart shall be caged. Ladders shall conform to OSHA 1910.27 and ANSI A14.3.

3.3.1.14. PLATFORMS AND WALKWAYS

Platforms and walkways shall be provided as specified and where required for safe operation and maintenance of all equipment. Platforms shall be minimum 30 inches by 36 inches unless otherwise specified. Walkways shall be minimum 30 inches wide unless otherwise specified. The supporting structure for platforms and walkways shall be rigid steel. Platforms and walkways shall be securely fastened in place to prevent shifting or movement when walked on. Platforms and walkways shall have a minimum load capacity of **200 75** pounds per square foot. Platforms and walkways shall support a 250-pound person without any component exhibiting elastic deflection greater than 0.12 inch or permanent deformation. Platforms and walkways shall not hinder maintenance access to any equipment. Platforms and walkways shall not interfere with the transfer or storage of pallets.

3.3.1.14.1. DECKING

Platform and walkway decking shall be open grating type providing high traction and a non-slip surface even when wet. The decking shall be level +/- 0.25 inch. Attachment hardware shall not be a tripping hazard. Elevation differences between the top of adjacent decking sections shall not exceed 0.12 inch. Platform and walkway decking shall be removable by one person if removal is required for maintenance access.

3.3.1.14.2. FALL PROTECTION

Platforms and walkways shall have fall protection consisting of handrails, mid-rails, and kick plates. Fall protection shall be provided around the entire perimeter of the platform and walkway except adjacent to a conveyor at the same elevation, at stair and

ladder interfaces, and at interfaces with other platforms and walkways. The distance between conveyor side guides and fall protection shall be 5 inches +/- 1 inch so the fall protection does not interfere with overhung loads. Fall protection shall conform to OSHA 1910. Handrails shall be a minimum of 1.25 inches in diameter and shall be 42 inches +/- 2 inches above the decking. The distance between handrail support posts shall be maximum 60 inches. Handrails shall withstand a minimum load of 200 pounds applied in any direction on the top rail without permanent deformation or damage. Kick plates shall extend a minimum of 4 inches above the decking. The distance between the decking and the bottom of the kick plate shall be maximum 0.25 inch.

3.3.1.15. HUMAN ENGINEERING

The system design and layout shall incorporate ergonomic design criteria so the optimal interface between operator and equipment is attained.

3.3.2. MATERIALS

3.3.2.1. STEEL

The structural steel components shall meet all design property requirements of AISC M016.

3.3.2.2. MECHANICAL FASTENING DEVICES

Unless otherwise specified, all threaded connectors of diameter greater than 7/16 inch shall be either A325 bolts conforming to ASTM A325 or SAE Grade 5 bolts conforming to SAE J429. All structural joints shall be in accordance with AISC M016. Bolt hole diameters shall not exceed nominal bolt diameters by more than 1/16 inch. All bolt holes shall be free of burrs, pins, or slivers. Bolts shall extend a minimum of two threads beyond the nuts. All nuts, bolts, and other threaded fasteners shall be plated or galvanized to prevent corrosion. All threaded fasteners shall utilize plated flat and lock washers as required.

3.3.2.3. ANCHORS

Anchors shall, at a minimum, meet the requirements of ASTM A307. Anchors shall be either the drop-in expansion type or wedge type. All anchors shall be sufficient in size to withstand the calculated pullout and shear forces experienced by the equipment. Minimum anchor sizes shall be 3/8 inch in diameter. Anchor lengths shall be long enough to assure that the manufacturer's minimum embedment in concrete is maintained and shall be installed properly to maintain the required minimum concrete embedment. Anchors shall be spaced so the manufacturer's recommended minimum allowable spacing between anchors is maintained and the recommended minimum allowable edge distance is maintained. All anchors shall be torqued to the manufacturer's recommended installation torque. Chemically bonded anchors may be used if approved by the COTR.

3.3.3. PROTECTIVE COATINGS

All metal system component surfaces shall be protected from corrosion by painting, plating, or galvanizing. Surface preparation and color shall be as specified in Table 2.

TABLE 2 - COLOR TABLE	
Component	Color and Protection Method (if Specified)
ETV including ETV conveyor	Safety yellow
MPETV including MPETV conveyor	Safety yellow
Pallet lift including lift conveyor	Safety yellow
Pallet lift forklift guards and maintenance access door	Safety yellow and galvanized
Staging dock conveyor	Galvanized
Staging dock conveyor interface roller frame	Safety yellow and galvanized
Storage conveyor	Galvanized
Lift transfer conveyor	Galvanized
Multi-pallet build-up conveyor	Galvanized
ALOC/Code J conveyor	Safety yellow and galvanized
Pallet contact surfaces of conveyor rollers	Primed and not painted
Pallet storage enclosure - rack structure	Galvanized
Pallet storage enclosure, exterior - walls, doors, visible columns, roof, and staging dock canopy	Architecturally compatible with the new air freight terminal
Pallet storage enclosure, interior - walls and roof	White or off-white (or manufacturer's standard color if approved by COTR)
Ladders and stairs	Safety yellow
Retractable pallet stops	Red and galvanized
Fixed Pallet Stops	Safety yellow and galvanized
Bollards, guards, and other forms of mechanical protection	Safety yellow
Sprinkler system	Red
NOTE: Any deviation from the color scheme shall be pre-approved by the COTR.	

3.3.3.1. PAINTING

Metal surfaces that are not stainless steel, galvanized, or plated shall be cleaned, treated, and painted to protect against rust, corrosion, and deterioration. Ferrous surfaces, including those that have been shop-coated, shall be solvent-cleaned.

Surfaces that contain loose rust, loose mill scale, and other foreign substances shall be cleaned mechanically with hand tools, power tools, or by sandblasting. The first coat of primer shall be applied to a dry clean surface as soon as practical after cleaning and treating the metal, and prior to any deterioration of the prepared surface. The primer shall not interfere with the application and adhesion of subsequent coats. Paint shall last the service life of the equipment. Paint shall be lead and chromate free and meet air pollution requirements for solvent emissions. The finish coat shall be a smooth, even surface, free from runs, sags, and defects when dry. Welded surfaces shall be cleaned and painted after the welding process is complete. Prepainted accessories, as well as surfaces not requiring paint, shall be protected from overspray. The following areas shall not require paint: wire rope and hoist drum for ETV platform lift, contacting surfaces of the ETV collectors and feed rail, ETV crane rail and contacting surfaces of the ETV wheels, and the contacting surfaces between the lift wheels and running surface. When several standard colors are available, a color selection chart shall be submitted to the COTR with the shop drawings for selection. Component colors shall conform to Table 2. Paint shall contain a mildewcide that will not adversely affect the color, texture, or durability of the coating. The paint and process used shall be appropriate for the environment at Dover AFB and shall be approved by the COTR.

3.3.3.2. PLATING

All surfaces to be plated shall be thoroughly cleaned to provide a surface free of mill scale, oil, grease, dirt, rust, and any other foreign material prior to being plated. Plating at a minimum shall comply with ASTM B633, Service Condition 1, Type I unless otherwise specified.

3.3.3.3. GALVANIZING

All metal surfaces to be galvanized shall be thoroughly cleaned to provide smooth surfaces and shall comply with ASTM A153 and ASTM A123.

3.3.3.4. DISSIMILAR METALS

Materials used and their locations shall not promote galvanic corrosion. No combination of materials shall be used that form an electrolytic couple of such nature that corrosion is accelerated.

3.3.4. WELDING

Dimensional tolerances for welded construction, details of welds, and quality of welds shall be in accordance with the applicable requirements of AWS B2.1, AWS D1.1, and AWS D14.1. The Government reserves the right to perform supplemental nondestructive and destructive tests to determine compliance. Safety precautions during welding shall conform to ANSI Z49.1.

3.3.4.1. WELDING PROCEDURE QUALIFICATION

Qualification of welding procedures shall conform to the applicable requirements of AWS B2.1, AWS D1.1, and AWS D14.1. The Government reserves the right to request copies of Welding Procedure Specifications for any welding procedure followed in the fabrication of this system.

3.3.4.2. WELDER PERFORMANCE QUALIFICATION

Each welder, welding operator, and tack welder assigned to work on this system shall be qualified in accordance with the applicable requirements of AWS B2.1, AWS D1.1, and AWS D14.1. The Government reserves the right to request certification (Performance Qualification Test Record) that each welder, welding operator, or tack welder is qualified as specified.

3.3.5. FIRE PROTECTION

Fire protection requirements shall be as specified in the building requirements and shall conform to ~~MIL-HDBK-1008G~~ UFC 3-600-01 and AFOSH 127-56.

3.3.6. CUTTING

All edges produced by oxygen-flame cutting or any cutting operation shall be finished by grinding (or other method approved by the COTR) to a surface finish equivalent to that of adjacent surfaces. Sharp edges shall not be acceptable.

3.3.7. NAMEPLATES

The Contractor shall provide and install one corrosion resistant metal nameplate for each component (i.e., each ETV, each pallet lift, each pallet lift conveyor, each pallet lift transfer conveyor, each staging dock conveyor, etc.) Only the four end storage conveyors on each level shall require a nameplate. Nameplates shall be located in a visible and safe location. Nameplates shall last the life of the equipment and shall be capable of withstanding local environmental conditions. Nameplates shall be stamped, engraved, or etched in a print type not less than 0.12 inch tall. No nameplate or product marking shall be installed until all touch-up painting has been completed. The nameplate or product marking shall clearly display the following headings and corresponding information:

- Type of equipment
- Name of manufacturer
- Model Number
- Contract Number
- Serial Number
- Capacity
- Weight
- Manufacture Date, Month/Year
- "Property of US Government"

3.3.8. PRECEDENCE

Where local codes and standards conflict with the contents of this PD, the more stringent requirement shall prevail.

3.4. DOCUMENTATION

The Contractor shall provide documentation (data submittals) as specified herein. All data submittals shall be attachments the transmittal form specified in the solicitation. All submittals shall be complete; piecemeal submittals shall not be accepted. The Contractor shall coordinate and prepare the processing of submittals with the performance of work so that work will not be delayed by submittal processing. The Contractor shall allow a review period, beginning with receipt by all addressees, ~~which includes at least 15 working days (30 days for the equipment shop drawings).~~ Of 21 days. Submittal addresses are contained in the solicitation or will be provided after award.

3.4.1. EQUIPMENT SHOP DRAWINGS

Equipment shop drawings shall be level 2 drawings. Equipment shop drawings shall cover all equipment for the air cargo system that is not considered construction as detailed in Appendix H. Equipment shop drawings submittal schedule shall allow 30 days for review and additional time for resolution of any deficiencies so the equipment shop drawings can be approved prior to the commencement of manufacturing. Equipment shop drawings shall be accompanied by complete information concerning the material (such as manufacturer, model number, and applicable cut sheets) and design proposed for use in sufficient detail to show compliance with the specification, and shall be approved before incorporation into the work. Submit 4 copies to the Corps of Engineers, 1 copy to base civil engineering, 1 copy to the using organization, and 1 copy to AFMC-LSO/LOE.

3.4.2. OPERATIONS AND MAINTENANCE (O&M) MANUALS

O&M manuals shall be due 90 days prior to testing. The maintenance, testing, inspection, and operator qualification requirements of AFOSH 91-46 shall be incorporated into the O&M manuals. Submit 1 copy to the Corps of Engineers, 1 copy to base civil engineering, 1 copy to the using organization, and 1 copy to AFMC-LSO/LOE. The manuals shall be updated to reflect all changes made to the system prior to acceptance.

3.4.3. RECOMMENDED SPARE PARTS LIST

A recommended spare parts list shall be due 90 days prior to testing. Submit 1 copy to the using organization and 1 copy to AFMC-LSO/LOE.

3.4.4. REQUIREMENTS CERTIFICATIONS

The certification of all requirements listed in section 4.3. of this document and all appendices shall be due prior to the beginning of the quality conformance test. Submit 1 copy to the Corps of Engineers, 1 copy to base civil engineering, 1 copy to the using organization, and 1 copy to AFMC-LSO/LOE.

3.4.5. SYSTEM CHECKOUT CERTIFICATION

Certification that the system has passed all requirements listed in section 4.3. of this document and all appendices shall be due before the quality conformance test is scheduled. Submit 1 copy to the Corps of Engineers, 1 copy to base civil engineering, 1 copy to the using organization, and 1 copy to AFMC-LSO/LOE.

3.4.6. AS-BUILT EQUIPMENT DRAWINGS

As-built equipment drawings shall be due 30 days after equipment acceptance. As-built equipment drawings shall cover all equipment for the air cargo system that is not considered construction as detailed in Appendix E-H. Submit 1 copy to the Corps of Engineers, 1 copy to base civil engineering, 1 copy to the using organization, and 1 copy to AFMC-LSO/LOE.

3.5. SPARE PARTS

The spare parts listed below shall be provided with the system. All spare parts shall be new items with a full manufacturer's warranty. The Contractor shall replace any parts used during the warranty period, other than preventive hydraulic fluid and filter replacement, at no cost to the Government.

- A. Encoders: Provide 1 spare encoder for each type of encoder used in the system.
- B. Motors: Provide 1 spare horizontal travel motor and 1 spare vertical travel motor.
- C. Electronic Drive Units: Provide 1 spare electronic horizontal drive unit and 1 spare electronic vertical drive unit. The drive unit shall consist of the frequency inverter, adjustable frequency drive, and all other components required developing the signal sent to the drive motor.
- D. Sensors: Provide 1 spare sensor for every 10 sensors or fraction thereof for each type of sensor used in the system, up to a maximum of 3 sensors of each type.
- E. Hydraulic fluid (if hydraulic lift system): Provide spare hydraulic fluid in new, unopened 5 to 10 gallon containers in sufficient quantity to completely replace the fluid used in 2 lift systems
- F. Hydraulic filters (if hydraulic lift system): Provide two spare filters for every filter in the system. For example, for a filter that is used once on every lift, provide 42 20 of that filter since there are 6 10 lifts.
- G. Lift actuator motor (if electric lift system): Provide 1 spare electric lift motor or lift

actuator mechanism.

3.6. ORIENTATION

The Contractor shall provide technical services and materials to orient Government personnel. Fully qualified Contractor personnel who are knowledgeable of the system shall accomplish all orientation. Courses shall be combined with the Contractor's standard commercial training courses, where applicable, provided all aspects of training are included. Orientation shall be provided at Dover AFB. The Contractor shall provide each attendee with a certificate indicating successful completion of the orientation. All orientation shall be completed prior to the start of the quality conformance test. Training handouts summarizing all important details shall be provided with each training session. Three system operator training sessions shall be provided to accommodate personnel on all shifts. Each session shall provide the number of hours of training specified.

3.6.1. SYSTEM OPERATOR ORIENTATION

This orientation shall provide instructions in the overall operational functions that are performed by the system operators. Instructions shall include the operation of all system components, including manual operation. Upon completion of this course, the operators shall be able to operate all components of the system. Operators shall be able to perform these functions using only the reference manuals provided with the system relative to operations. Operators shall be taught how to perform manual operation of the system without maintenance personnel. Approximately 20 students with possibly no experience will attend each training session.

3.6.1.1. SYSTEM OPERATOR CLASSROOM INSTRUCTIONS

The classroom phase shall include instructions in the operational requirements of the installed system. Classroom instructions shall include a briefing and orientation on the use of the operation manuals supplied by the Contractor. Classroom instructions shall be developed so it can be placed on videotape. Classroom instructions shall be a minimum of 2 hours.

3.6.1.2. SYSTEM OPERATOR HANDS-ON INSTRUCTIONS

The hands on phase shall include actual operation of the system under the supervision and instruction of the Contractor. Instruction shall include manual operation of all conveyors and components. Hands-on instruction shall be a minimum of 4 hours.

3.6.2. MAINTENANCE ORIENTATION

This orientation shall provide instructions in corrective and preventive maintenance for all components of the system. Instruction shall include troubleshooting, removal, installation and adjustment of all system components. Upon completion of this

orientation, students shall be able to install, adjust, and maintain all equipment provided using only the maintenance reference manual delivered. Approximately 8 students with possibly no experience will attend.

3.6.2.1. MAINTENANCE CLASSROOM INSTRUCTION

The classroom phase shall include instruction in the maintenance requirements of the installed system. Classroom instruction shall include a briefing and orientation on the use of the maintenance manuals supplied by the Contractor. Classroom instruction shall be developed so that it can be placed on videotape. Classroom instruction shall be a minimum of 8 hours.

3.6.2.2. MAINTENANCE HANDS-ON INSTRUCTION

The hands-on phase shall include actual field instruction in the maintenance requirements of the installed system. Hands-on instructions shall be a minimum of 16 hours. The instructor shall go through actual maintenance and perform it during the course. For example, the instructor shall actually change drive motors, inspect conveyor drive chains, and lubricate the ETV and allow the students to participate.

3.6.3. REFERENCE MATERIAL

Schematics of the system and its major components shall be provided in two formats; they shall be printed on separate sheets of paper and laminated so the schematics can be used while performing maintenance and then wiped clean afterwards and submitted on two sets of CDs in a PDF format or equivalent. Approval of the specific schematics necessary for lamination shall be obtained from the COTR. The reference materials shall be submitted with the maintenance manuals.

3.6.4. PLC ORIENTATION

PLC orientation shall be provided at Dover AFB. A maximum of 16 students will attend. Personnel maintaining similar equipment at other Government facilities may attend the PLC orientation. The PLC orientation shall be a minimum of 120 hours and shall be conducted between 0800 and 1600 from Monday through Friday. The PLC orientation shall cover all types of PLCs provided with the system. Emphasis shall be placed on troubleshooting and modifying existing code by adding timers and counters instead of writing a program from scratch. Orientation shall also be provided for the specific PLC software program provided with the programming terminal. One programming terminal (including software) and PLC shall be provided for every two students. These programming terminals and PLCs shall remain the property of the trainer. The PLC orientation shall be conducted by qualified Contractor personnel, authorized training representatives of the PLC manufacturer, or a training company approved by the COTR. The PLC orientation shall be split into three separate classes; the first 40 hours of the PLC orientation shall be an introductory course designed for students with little or no experience with PLCs. The introductory course shall include Boolean algebra,

ladder logic, basic programming, adjusting timers, I/O configuration, counters, operating modes, addressing modes, registers, basic troubleshooting, and the specific hardware and software capabilities of the PLCs provided. The second 40 hour course shall be an advanced course specifically designed for personnel maintaining equipment similar to the provided system. The advanced course shall include 20 or more hours of hands-on in-classroom instruction to cover more advanced operations of the programming language to include but not limited to math, comparison, data handling, program flow and application specific instructions. The third 40 hour course shall be a highly advances course, which include 20 or more hours of hands-on real property instruction to cover any and all PLC/SLC ladder logic instructions. The Contractor shall provide each attendee of each course with a certificate indicating successful completion of the orientation. Each course shall be separated by a minimum of one week.

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FIGURE 1

~~CARGO PROCESSING CENTER, DOVER AFB DELAWARE~~

~~UNDER REVISION~~

4. QUALITY ASSURANCE PROVISIONS

4.1. GENERAL

The COTR will monitor the installation of the system. The system delivery dates shall not be extended because of work stoppages caused by unacceptable practices or test failures. For all inspections and tests, the Contractor shall provide all test apparatus (i.e., tape measures, levels, calipers, micrometers, stop watches). All test apparatus will be returned to Contractor upon completion of all tests. The Government will provide all test loads. The Contractor shall be responsible for performing all inspections and tests. The Contractor shall provide a knowledgeable and authoritative representative on site during the entire acceptance tests.

4.2. ACCEPTANCE TESTS

Three tests must be successfully completed prior to the Government accepting the system. These tests are the system checkout test, the quality conformance test, and the reliability demonstration test.

4.2.1. SYSTEM CHECKOUT TEST

Upon completion of installation, the system shall be checked out by the Contractor using loads of the type specified. The Contractor shall inspect the system to assure that the system meets all the requirements of 4.3.1. The Contractor shall also test the system in accordance with the tests defined in 4.3.2. All inspections and tests shall be repeated until all modifications and adjustments are complete and the system passes all inspections and tests. The Contractor shall submit written certification to the Contracting Officer that the system has passed the requirements of this paragraph. The COTR will schedule the quality conformance test to start within 10 days following the receipt of the written certification from the Contractor.

4.2.2. QUALITY CONFORMANCE TEST

All work shall be scheduled so only one quality conformance test is required. The Contractor shall provide the requirements certification and the system checkout certification prior to the start of the quality conformance test. The Contractor, in the presence of the COTR, shall inspect the system to confirm that the system meets all the requirements of 4.3.1. The Contractor, in the presence of the COTR, shall also test the system in accordance with the tests defined in 4.3.2. Upon successful completion of all tests and inspections and the receipt of all certifications, the reliability demonstration test shall start.

4.2.3. RELIABILITY DEMONSTRATION TEST

After successful completion of the quality conformance test, each component of the system shall demonstrate a reliability and availability greater than or equal to that listed in the reliability and availability table in 3.3.1.1. Trained Government personnel will operate the system during the reliability demonstration test. In addition, all static components shall demonstrate compliance with the requirements of the PD. The test period shall be the 30 calendar days immediately following the successful completion of the quality conformance test. If the system does not demonstrate the required reliability and availability or compliance with the PD, the test will be restarted from the beginning after the Contractor has taken corrective action. The Contractor shall be allowed to restart the reliability demonstration test a maximum of 2 times. If the system fails to pass the reliability demonstration test within 3 attempts, then the system may be rejected.

4.2.4. MAINTENANCE SUPPORT DURING TESTING

The Contractor shall provide a maintenance technician on-site during the reliability demonstration test. The maintenance technician shall perform all preventive and corrective maintenance required on the system during the reliability demonstration test. The Contractor shall provide all tools, fluids, parts, and other items necessary to perform maintenance during the reliability test. The maintenance technician shall be knowledgeable in all aspects of the system and shall be able to correct all problems that arise. The maintenance technician shall provide on-going maintenance training during the reliability test. The maintenance technician shall work during normal working hours, a minimum of eight hours per day, Monday through Friday and shall be on-call during all other hours Monday through Sunday. The technician shall arrive on-site within one hour after a call is made to a Contractor-provided telephone number.

4.3. INSPECTIONS, TESTS, AND CERTIFICATIONS

This section defines all inspections and tests that must be completed as part of the system checkout test and repeated at the quality conformance test. This section also includes a list of all certifications that must be received from the Contractor on or before the start of the quality conformance test. The Contractor may add to this list, or question any requirement, by sending a letter to the Contracting Officer prior to the acceptance tests. The COTR will classify all deficiencies encountered into one of the defect classifications listed below. Any critical or major defect found shall be cause for rejection of the system. Any minor defect shall leave the rejection of the system at the discretion of the COTR.

Critical Defect - A defect that judgment and experience indicate is likely to result in hazardous or unsafe conditions for individuals using, maintaining, working near, or depending upon the equipment.

Major Defect - A defect other than critical, which is likely to result in failure, or reduce materially the system for its intended purpose.

Minor Defect - A defect that is not likely to reduce materially the usability of the system for its intended purpose, or is a departure from established standards having little bearing on the effective use or operation of the system.

4.3.1. INSPECTIONS

The system shall be inspected to verify that it meets all the requirements of sections 1, 2, and 3 of the Cover PD and Appendices A through F. These inspections shall be completed as part of the system checkout test and again as a part of the quality conformance test.

4.3.2. TESTS

The following tests and all tests in Appendices A through F shall be performed on the system as part of the system checkout test and again as a part of the quality conformance test.

<u>No.</u>	<u>Paragraph</u>	<u>Test</u>
1.	3.2.1.	Measure the noise level of each component during operation. Measurements shall be taken three feet from the component at a height of five feet above the ground and one foot from the front of each control console at a height of five feet above the ground. If the eight-hour time weighted average noise level exceeds 85 dB (A) for any component, that component fails this test.
2.	3.2.2.10. 3.2.3.	Operate all electrical components of the system. Disconnect the transformer supplying power to the system. After the back-up generator restores power, attempt to operate all components of the system. Restore the normal electrical power and attempt to operate all components of the system. If any component does not operate normally from the power supplied by the back-up generator, if any component does not operate properly with power supplied from the transformer, if special procedures are required to restart or otherwise operate any component during this test, or if any component requires manual initialization or recalibration, that component fails this test.
3.	3.2.3.3.	Test all continuous-contact controls in the system by using then releasing the control. If the control does not return to the neutral position or if the action started by the control does not end when released, the component with that control fails this test.

4. 3.2.3.2.
 3.2.3.4. Have one person operate the controls while moving a 463L pallet over every roller in the system in both the inbound and outbound directions. The person may move to different consoles, but shall interact with the system only through the consoles. If one person is unable to transfer the pallet through the system unassisted, if controls or consoles interfere with pallet movement or blocks the operator's view of the pallet, the controls fail this test.
5. 3.2.3.6. Test the console lockout for all equipment that can be controlled from two or more consoles. While operating the equipment from one console, attempt to operate the same equipment from a different console that controls the equipment. Repeat for all consoles for all equipment with more than one control console. If the first console used does not render the second console inoperable, the component with that control fails this test.
6. 3.2.3.10. While operating a conveyor, depress an emergency stop button for that conveyor. Attempt to operate the conveyor from all consoles capable of operating that conveyor. Clear the emergency stop button and operate the conveyor. While operating the pallet lift, depress an emergency stop button for the lift. Attempt to operate the lift. Clear the emergency stop button and operate the lift. While operating the ETV, depress an emergency stop button on the ETV. Attempt to operate the ETV from both control consoles. Clear the emergency stop button and attempt to operate the ETV from both consoles. Repeat for each emergency stop button in the system. If the conveyor, lift, or ETV does not stop when the button is depressed; if any retractable pallet stops raise when an emergency stop is activated, if the conveyor, lift, or ETV will operate while the emergency stop button is depressed; if the conveyor, lift, or ETV is not enabled by clearing the emergency stop button, the component with that emergency stop button fails this test.
7. 3.2.4. Connect the programming terminal to each PLC in the system. Verify the hardware and software provided enables maintenance personnel to troubleshoot and modify the PLC program. If the hardware and software do not permit the PLC program to be modified, the programming terminal fails this test.

4.3.3. CERTIFICATIONS

The Contractor shall provide certification that the following requirements and the certification requirements in Appendices A through G H have been met.

<u>No.</u>	<u>Paragraph</u>	<u>Certifications</u>
1.	3.2.2.3.	The installation conforms to applicable rules of NFPA 70.
2.	3.2.2.9.	All enclosures and controls conform to NEMA ICS 6, type 12 indoors and type 4 outdoors and beneath canopies.
3.	3.2.2.12.	Electric motors shall conform to the requirements of NEMA MG-1.
4.	3.2.2.12.	All motors are rated for continuous duty at an ambient temperature of 40 degrees Celsius.
5.	3.2.3.	All electrical controls comply with NEMA ICS 2.
6.	3.3.1.2.	The system was designed, fabricated, and installed to facilitate maintainability and ensure a minimum service life of 15 years.
7.	3.3.1.9.	Provide calculations from a registered Professional Engineer showing the system was designed to withstand seismic zone 1 conditions.
8.	3.3.1.11.1.	The system installation practices and completed system meet all applicable requirements of OSHA 29 CFR 1910 and OSHA 29 CFR 1926.
9.	3.3.1.11.2.	Guards are provided in accordance with ANSI B15.1.
10.	3.3.1.11.5.	All conveyor design, components, and controls conform to ANSI B20.1.
11.	3.3.2.1.	The structural steel components meet all design property requirements of AISC M016.
12.	3.3.2.2.	All threaded connectors of diameter greater than 7/16 inch are either A325 bolts conforming to ASTM A325 or SAE Grade 5 bolts conforming to SAE J429.

- 13. 3.3.2.2. All structural joints are in accordance with AISC M016.
- 14. 3.3.2.3. Anchors conform to ASTM A307.
- 15. 3.3.3.2. Plating complies with ASTM B633, Service Condition 1, Type I.
- 16. 3.3.3.3. All galvanized metal surfaces conform to ASTM A153 and ASTM A123.
- 17. 3.3.4. Dimensional tolerances for welded construction, details of welds and quality of welds are in accordance with the applicable requirements of AWS B2.1, AWS D1.1 and AWS D14.1.
- 18. 3.3.4.2. Each welder, welding operator, and tack welder assigned to work on this system was qualified in accordance with the applicable requirements of AWS B2.1, AWS D1.1, and AWS D14.1.
- 19. 3.3.5. Fire protection requirements conform to ~~MIL-HDBK-1008~~ UFC 3-600-01 and AFOSH 127-56.

Global Air Transportation Execution System (GATES) Development, Maintenance and Support

Interface Design Description for the Mechanized Materials Handling System Interface EU*-IDDMMHS-02.01

12 February 2004

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1. SCOPE

1.1. Identification

This Interface Design Description (IDD) Document EU*-IDDMMHS-02.01 Contract Data Requirements List (CDRL) number A049, specifies the external interface design for the Global Air Transportation Execution System (GATES) and the Mechanized Materials Handling System (MMHS). This document is provided under Contract Number DCA200-02-D-5006, Task Order 0017.

1.2. System Overview

GATES is being developed by Computer Sciences Corporation (CSC) and its subcontractors for the United States Air Force (USAF) Air Mobility Command (AMC) A66C. The purpose of GATES is to replace the legacy systems that support the AMC transportation mission with a modernized, fully-integrated, and significantly enhanced global transportation system using an open systems infrastructure and shared, relational database that enable new requirements to be easily incorporated in the future.

GATES provides AMC, the Department of Defense (DoD), and commercial partners with automated functionality to process and track cargo and passenger information, support management of resources, support scheduling and forecasting, provide logistical support information, generate standard and ad hoc reports, and provide message routing and delivery service for virtually all airlift data. Intended users of GATES include, but are not limited to, Headquarters (HQ) AMC, AMC Logistics Operations Branch, Tanker Airlift Control Center (TACC), Airlift Clearance Authorities (ACAs), Service Airlift Validators, Passenger Reservation Centers (PRCs), Military Transportation Offices (MTOs), commercial reservation systems users, and various work centers such as the Air Terminal Operations Center (ATOC). Planned GATES operation sites are HQ AMC and the aerial ports (e.g., Travis Air Force Base [AFB], CA; Dover AFB, DE).

At the beginning of the GATES program, the developer interviewed functional users, at both HQ AMC and at the various aerial ports, and analyzed existing legacy systems. Applying the information gathered during the on-site interview, problem domain learning process, the developer built an object-oriented (OO) model depicting requirements. Data from the model served as the basis for development of software and system requirements documents. The developer created requirements, design, testing, and user documentation for the five Computer Software Configuration Items (CSCIs). This suite of documentation served as the foundation for the Build 1 development. Build 1 development was completed in November of 1997.

Development of Build 2 began with the scheduling and execution of a series of Joint Application Development (JAD) sessions to develop new functional and system requirements. The first Build 2 release was fielded in July 1999. This IDD is one of several that document the design of the interfaces to external systems.

GATES must interface with a number of external systems. These external systems provide a variety of information needed by the users of the system to accomplish their assigned tasks. This information includes: cargo and passenger movement status, cargo and passenger movement history, passenger reservations, movement and capability forecasting, cargo advance processing, billing and tariff information, and mission schedule information.

MMHS is a fully automated pallet storage system. It allows input commands from authorized computer terminals, attached control panels, scales, and laser scanners. MMHS sorts and stores 463L pallets for efficient retrieval. It retrieves, rotates, and sequences pallets as directed, based on a given load plan.

1.3. Document Overview

This document is developed in accordance with MIL-STD-498.

Section 1 provides the identification and overview of this document and GATES. Section 2 provides a list of referenced documents. Section 3 identifies the data fields that are passed between the systems, the record layouts, sample data, expected interface volume and frequency, priority, and security. Section 4 describes the Qualification Provisions. Section 5 provides information about the traceability of interface requirements into the design. Section 6 contains an acronym and abbreviation list and the definitions of selected terms. Section 7 identifies where procedures required to modify the external interface can be found.

2. REFERENCED DOCUMENTS

Documents and manuals referenced in this IDD are listed below. If a government document is not available through government stocking for the Office of Primary Responsibility, a source from which the document may be obtained is identified. All vendor referenced documents are available through the vendor.

- a. Military Standard, Software Development and Documentation (MIL-STD-498), 5 December 1994
- b. EU*-STP-02.02, Global Air Transportation Execution System (GATES) Build 2 Software Test Plan, 31 July 1998, Final

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3. INTERFACE DESIGN

3.1. GATES-MMHS Interface (EU*-EID-036)

The GATES-MMHS interface provides an exchange of information about pallets. GATES creates a file containing one or more records with information about pallets, load plans, and/or missions. MMHS reads that file and applies that information to its database. As pallets are stored in the MMHS, it creates files containing one or more records with information about each pallet.

Subsequent paragraphs describe the realization of the GATES-MMHS interface in terms of hardware, communications protocols, network connections, file format and contents, and manual operations.

The data flow for the GATES-MMHS interface is shown in Figure 3.1-1.

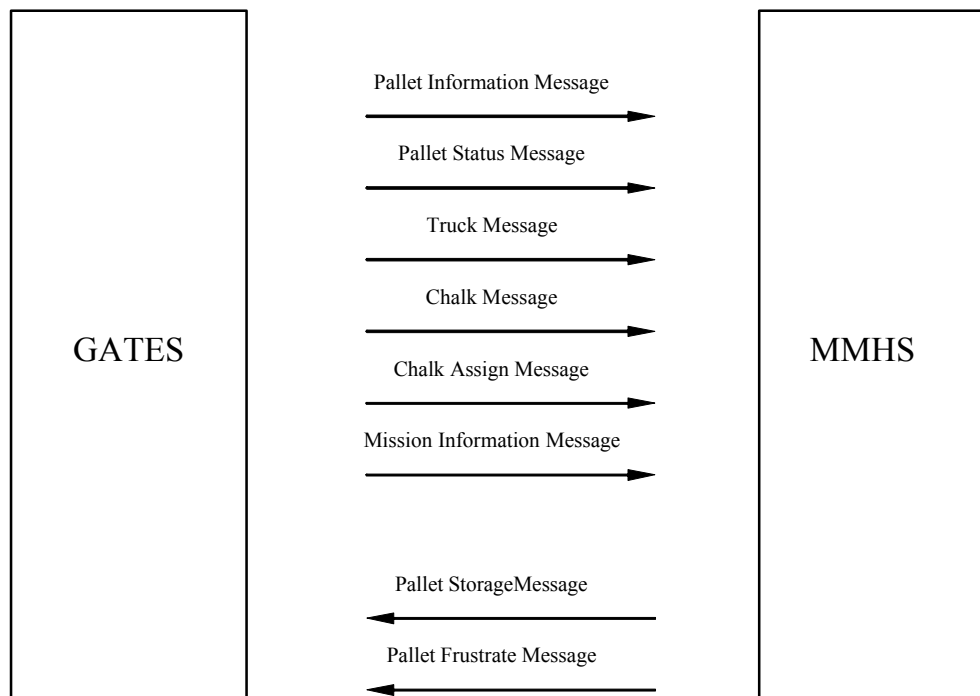


Figure 3.1-1. GATES-MMHS Interface

The GATES Central Site is located in Building 1575, Consolidated Computer Facility (CCF), Scott AFB, Illinois (IL). The GATES system operates on Sun hardware platforms at approximately 20 major ports around the world. These GATES ports also operate on Sun hardware platforms. Each port has a database containing the data specific to its needs. This data is shared with other ports via Sybase replication. The GATES client operates on IBM compatible PCs using the Windows operating systems (Windows 2000 or Windows XP). MMHS also operates on a dedicated LAN. A Windows PC will be used as an intermediary between the two LANs to aid in the secure transfer of data.

3.2. GATES-MMHS Files

As part of its processing, GATES and MMHS will save and read American Standard Code for Information Interchange (ASCII) text files as defined below. Individual records within the file will be separated by a single ASCII carriage return character. Individual fields within these records will be delimited by a “|” (pipe) character.

At the most basic level, the information sent between GATES and MMHS may be described in terms of data fields. All fields are uniquely named with respect to one another and are transported between GATES and MMHS as strings of ASCII characters. Associated with each field is a description, size (e.g., length in characters), limits/range (e.g., list of allowed values), set of legal checks (e.g., the set of ASCII characters that may comprise a legal value of the field), and comments. The possible legal checks are described in Table 3.2-1. The data fields sent across the GATES-MMHS interface are described in later paragraphs.

Table 3.2-1. Legal Checks Legend

Legality Checks	Character Set
A	Alphabet (A-Z)
B	Blank/Space
N	Numerals (0-9)
S	Special characters (printable only; comments will contain any specific restrictions)
X	Numerals (0-9) or alphabet (A-Z)

The tables in the following paragraphs present the message format for interfaces, and contain data items with the following conventions, with column names in parenthesis:

- **Message Name** -- The name of the incoming/outgoing message.
- **Record Name** -- The name of the record inside the message.
- **Field Name (Field Name)** – The name of the data field.

- **Record Positions (Pos)** -- Due to the use of a delimiter character to separate fields within each record, the Pos column has been left blank in this document.
- **Field Length (Len)** -- Due to the use of a delimiter to separate fields, the Len column provides the maximum length of the field. The actual length of the field is determined by the contents of the field and the internal database definition of the field.
- **Category (Cat)** -- Values are:
 - C -- Conditional, included if certain conditions apply;
 - M -- Mandatory, must be included in Message;
 - O -- Optional, included at user discretion.
- **Edit Checks (Chks)** -- Checks. Lists the abbreviations for the legality checks that are applied to the field.
- **Limits and Ranges (L/R)** -- Lists a specific range or set of values allowed in the field.
- **Comments/Explanation/Algorithm (Comments/Explanation/Algorithm)** -- This paragraph provides a narrative on the field's properties or directions for completing the message, and is used to indicate restricted domains (e.g., ranges), table match validations, and other items. It also provides a brief description of the algorithm used to convert the data where appropriate.

3.3. GATES-MMHS File Descriptions - Incoming

MMHS will produce two different messages for GATES, the Pallet Storage Message, and the Pallet Frustrate Message. Each file will contain one or more messages of either type in any order and any combination. Messages will be accumulated for 1 minute or up to 100 messages per file. These messages are described in detail later in this section. Fields within the records are delimited by the "|" (pipe) character. The delimiter will not be detailed in the record formats.

3.3.1. File Naming Conventions

The file names will be in the format MMHSapcYYYYMMDDhhmmss where "MMHS" is a literal; "apc" is the 3-character Aerial Port Code for the location; "YYYY" is the 4-digit calendar year, "MM" is the 2-digit month of the year; "DD" is the 2-digit day of the year, "hh" is the 2-digit hour of the day (Zulu), "mm" is the 2-digit minute of the hour, and "ss" is the 2-digit second of the minute.

3.3.2. File Location

Files will be placed in the 'outbound' directory on the intermediary Windows PC. A transfer executable will automatically send files to the 'inbound' directory on the GATES system.

3.3.3. Record Descriptions

3.3.3.1. Pallet Storage Message (EU*-EID-036-01)

The Pallet Storage message is used by MMHS to inform GATES that a pallet has been accepted for storage in the MMHS system or to report that there is a difference between the GATES reported data and the MMHS reported data.

3.3.3.1.1. Pallet Storage Record Format

The format of the Pallet Storage Record is shown in Table 3.3.3.1.1-1. Sample data is shown in Table 3.3.3.1.1-2 and a sample record is provided in Figure 3.3.3.1.1-1.

Table 3.3.3.1.1-1. Pallet Storage Record Format

Field Name	Pos	Len	Chks	Cat	L/R	Comments/Explanation/Algorithm
Transaction Type		3	A	M	“STR”	Identifies the transaction as a Pallet Storage message.
Pallet ID		6	X	M		Pallet ID of the pallet.
Pallet Status		3	A	M		Status of the pallet in MMHS.
Grid Location		4	X	M		A dummy Grid Location (“9M99”) will be used for all pallets stored in the MMHS facility. Actual Grid Locations will be used for any pallets stored outside the MMHS facility.
Center of Balance		3	N	M		Represents the ‘balance point’ of the pallet from front to back in inches.
Height		3	N	M		Height of the pallet in inches.
Gross Weight		6	N	M		Total weight of the pallet in pounds. This includes the contents, packing material, devices, chains, straps, nets, etc.
Pallet Configuration		2	A	M		Code that defines the configuration of the pallet.
Module Type		1	A	M		Code that indicates the type of aircraft for which the pallet was built.
Equivalent Pallet Positions		2	N	M		The number of pallet positions required for the pallet. A 2-digit field is used with one decimal position being assumed. For example, a value of 15 represents 1.5 pallet positions.
Onward Mode		1	A	M	“A”, “L”, “S”	The mode by which the cargo is expected to leave the port: “A” = air; “S” = surface (truck to final destination); “L” = Landbridge (truck to another GATES port).

Table 3.3.3.1.1-1. Pallet Storage Record Format

Field Name	Pos	Len	Chks	Cat	L/R	Comments/Explanation/Algorithm
Remarks		255	XBS	O		Provides additional information about the pallet data. Should only be provided when the Pallet Status is a frustration status.
Event Date/Time		10	N	M		The data and time the message was created in Zulu time using 24-hour clock. Use YJJJHHMMSS format where “Y” is the last digit of the calendar year; “JJJ” is the 3-digit Julian day of the year; “HH” is the 2-digit hour of the day; “MM” is the 2-digit minute of the hour; and “SS” is the 2-digit second of the minute.

Table 3.3.3.1.1-2. Pallet Storage Record Sample Data

Field Name	Pos	Sample Data	Stage Table Mapping
Transaction Type		STR	Literal
Pallet ID		DOV3RG	
Pallet Status		CAP	
Grid Location		9M99	
Center of Balance		42	
Height		72	
Gross Weight		2580	
Pallet Configuration		T1	
Module Type		L	
Equivalent Pallet Positions		10	
Onward Mode		S	
Remarks			
Event Date/Time		4123142521	

STR DOV3RG CAP 9M99 72 2580 T1 L 10 S 4123142521

Figure 3.3.3.1.1-1. Pallet Storage Record Sample Record**3.3.3.1.2. Pallet Storage Record Business Rules/Constraints**

- MMHS will send a Pallet Storage message each time a pallet is accepted for storage in MMHS.
- MMHS will send a Pallet Storage message in response to each Pallet Information message received from GATES for a pallet that is already in storage.

- MMHS will identify any differences between data GATES has provided and data MMHS has measured to the MMHS user. This will allow the user to validate any changes before they are sent to GATES to update that database.
- MMHS will provide a message to the user that the Pallet Placard should be re-printed due to data changes, as appropriate.
- If the Pallet ID is not present in GATES, the transaction will be held and re-processed periodically.
- GATES will perform validation of the Gross Weight versus the Net Weight and will frustrate the pallet if the differences violate existing rules.
- GATES will use the Grid Location, Center of Balance, Height, Gross Weight, Pallet Configuration, Module Type, and Equivalent Pallet Positions to update the pallet data depending on the status of the pallet in GATES.
- MMHS may use Module Types that are not in the list of valid values in GATES. If this occurs, then GATES will ignore the value from MMHS.
- GATES will respond with a Pallet Information message with the latest values.

3.3.3.2. Pallet Frustrate Message (EU*-EID-036-02)

The Pallet Frustrate Message is used to inform GATES that MMHS has frustrated a pallet.

3.3.3.2.1. Pallet Frustrate Record Format

The format of the Pallet Frustrate Record is shown in Table 3.3.3.2.1-1. Sample data is shown in Table 3.3.3.2.1-2 and a sample record is provided in Figure 3.3.3.2.1-1. There will be one of these records for each table name. They will be followed by zero or more of the appropriate record type.

Table 3.3.3.2.1-1. Pallet Frustrate Record Format

Field Name	Pos	Len	Chks	Cat	L/R	Comments/Explanation/Algorithm
Transaction Type		3	A	M	"FRU"	Identifies the transaction as a Pallet Frustrate message.
Pallet ID		6	X	M		Pallet ID of the pallet.
Pallet Status		3	A	M		Status of the pallet in MMHS.
Remarks		255	XBS	O		Provides the reason the pallet is being frustrated.
Event Date/Time		10	N	M		The data and time the message was created in Zulu time using 24-hour clock. Use YJJJHHMMSS format where "Y" is the last digit of the calendar year; "JJJ" is the 3-digit Julian day of the year; "HH" is the 2-digit hour of the day; "MM" is the 2-digit minute of the hour; and "SS" is the 2-digit second of the minute.

Table 3.3.3.2.1-2. Pallet Frustrate Record Sample Data

Field Name	Position	Sample Data	Stage Table Mapping
Transaction Type		STR	Literal
Pallet ID		DOV3RG	
Pallet Status		FR2	
Remarks		CONTENTS DAMAGED IN TRANSPORT.	
Event Date/Time		4123142525	

STR DOV3RG FR2 CONTENTS DAMAGED IN TRANSPORT. 4123142525
--

Figure 3.3.3.2.1-1. Pallet Frustrate Record Sample Record**3.3.3.2.2. Pallet Frustrate Record Business Rules/Constraints**

- GATES will frustrate the pallet for the given reason depending on the current status of the pallet in GATES.
- GATES will respond with a Pallet Status message.

3.4. GATES-MMHS File Descriptions – Outgoing

GATES will produce six different messages for MMHS. Each file sent to MMHS will contain one or more messages of any type in any order and any combination. Messages will be accumulated for 1 minute or up to 100 messages per file. These messages are described in detail later in this section. Fields within the records are delimited by the “|” (pipe) character. The delimiter will not be detailed in the record formats.

3.4.1. File Naming Conventions

The file names will be in the format GATESapcYYYYMMDDhhmmss where “GATES” is a literal; “apc” is the 3-character Aerial Port code for the location; “YYYY” is the 4-digit calendar year, “MM” is the 2-digit month of the year; “DD” is the 2-digit day of the year, “hh” is the 2-digit hour of the day (Zulu), “mm” is the 2-digit minute of the hour, and “ss” is the 2-digit second of the minute.

3.4.2. File Location

Files will be placed in the ‘outbound’ directory on the GATES system. A transfer executable will automatically send files to the ‘inbound’ directory on the intermediary Windows PC.

3.4.3. Record Descriptions

GATES will produce six different messages for MMHS. These messages are described in the following paragraphs.

3.4.3.1. Pallet Information Message (EU*-EID-036-03)

The Pallet Information Message is sent from GATES to MMHS to provide information about pallets onhand at the location or inbound to the location. It also provides updates to pallet information and status.

3.4.3.1.1. Pallet Information Record Format

The format of the Pallet Information Record is shown in Table 3.4.3.1.1-1. Sample data is shown in Table 3.4.3.1.1-2 and a sample record is provided in Figure 3.4.3.1.1-1. There will be only one record of this type per file.

Table 3.4.3.1.1-1. Pallet Information Record Format

Field Name	Pos	Len	Chks	Cat	L/R	Comments/Explanation/Algorithm
Transaction Type		3	A	M	NFO	“NFO” identifies this as a Pallet Information message.
Pallet ID		6	X	M		Pallet Identifier of the pallet.
Pallet Status		3	A	M		3-character code indicating the status of the pallet as determined by GATES.
APOD		3	X	M		Aerial Port of Debarkation of the pallet; Aerial Port Code.
Transportation Priority		1	N	M	1-4	Transportation Priority for the pallet.
Special Priority		1	X	O		Special Priority for the pallet.
Onward Mode		1	A	M	A, L, S	Onward Mode of the pallet; “A” = Air, “S” = Surface, “L” = Landbridge.
Net Weight		6	N	M		Total of the weights of the contents of the pallet.
Gross Weight		6	N	M		Total weight of the completed pallet including all devices.
Height		3	N	M		Height of the pallet in inches.
Type Cargo Code		1	A	M		Provides an indication of the type of cargo on the pallet.
Grid Location		4	X	M		Grid Location of the pallet.
Equivalent Pallet Positions		2	N	M		The number of pallet positions required for the pallet. A 2-digit field is used with one decimal position being assumed. For example, a value of 15 represents 1.5 pallet positions.

Table 3.4.3.1.1-1. Pallet Information Record Format

Field Name	Pos	Len	Chks	Cat	L/R	Comments/Explanation/Algorithm
Module Type		1	A	M		Code that indicates the type of aircraft for which the pallet was built.
Center of Balance		3	N	M		Represents the 'balance point' of the pallet from front to back in inches.
Pallet Configuration		2	A	M		Code that defines the configuration of the pallet.
SET		8	N	M		Oldest SET for the contents of the pallet. Zulu time; 24-hour clock. YJJHHMM format where "Y" is the last digit of the calendar year; "JJJ" is the Julian 3-digit day of the year; "HH" is the 2-digit hour of the day; and "MM" is the 2-digit minute of the hour.
Event Date/Time		10	N	M		The data and time the message was created in Zulu time using 24-hour clock. Use YJJHHMMSS format where "Y" is the last digit of the calendar year; "JJJ" is the 3-digit Julian day of the year; "HH" is the 2-digit hour of the day; "MM" is the 2-digit minute of the hour; and "SS" is the 2-digit second of the minute.

Table 3.4.3.1.1-2. Pallet Information Record Sample Data

Field Name	Pos	Sample Data	Database Mapping
Transaction Type		NFO	
Pallet ID		DOV3EF	
Pallet Status		CAP	
APOD		AVB	
Transportation Priority		1	
Special Priority			
Onward Mode		A	
Net Weight		2157	
Gross Weight		2568	
Height		78	
Type Cargo Code		G	
Grid Location		8A02	
Equivalent Pallet Positions		10	
Module Type		L	
Center of Balance		42	
Pallet Configuration		T1	

Table 3.4.3.1.1-2. Pallet Information Record Sample Data

Field Name	Pos	Sample Data	Database Mapping
SET		33440932	
Event Date/Time		4034153512	

NFO DOV3EF CAP AVB 1 A 2157 2568 78 G 8A02 10 L 42 T1 33440932 4034153512
--

Figure 3.4.3.1.1-1. Pallet Information Record Sample Record**3.4.3.1.2. Pallet Information Message Business Rules/Constraints**

- The Pallet Information Message will be sent each time an originating pallet is capped.
- The Pallet Information Message will be sent each time one or more of the following fields is changed for a capped pallet: APOD, Transportation Priority, Special Priority, Onward Mode, Gross Weight, Center of Balance, and Grid Location.
- The Pallet Information Message will be sent for each pallet on an inbound air or surface manifest.

3.4.3.2. Pallet Status Message (EU*-EID-036-04)

The Pallet Status Message is sent from GATES to MMHS to update the status of a pallet.

3.4.3.2.1. Pallet Status Record Format

The format of the Pallet Status Record is shown in Table 3.4.3.2.1-1. Sample data is shown in Table 3.4.3.2.1-2 and a sample record is provided in Figure 3.4.3.2.1-1.

Table 3.4.3.2.1-1. Pallet Status Record Format

Field Name	Pos	Len	Chks	Cat	L/R	Comments/Explanation/Algorithm
Transaction Type		3	A	M	NFO	“NFO” identifies this as a Pallet Information message.
Pallet ID		6	X	M		Pallet Identifier of the pallet.
Pallet Status		3	A	M		3-character code indicating the status of the pallet as determined by GATES.
Event Date/Time		10	N	M		The data and time the message was created in Zulu time using 24-hour clock. Use YJJHHMMSS format where “Y” is the last digit of the calendar year; “JJJ” is the 3-digit Julian day of the year; “HH” is the 2-digit hour of the day; “MM” is the 2-digit minute of the hour; and “SS” is the 2-digit second of the minute.

Table 3.4.3.2.1-2. Pallet Status Record Sample Data

Field Name	Pos	Sample Data	Database Mapping
Transaction Type		STS	
Pallet ID		DOV3EF	
Pallet Status		MAP	
Event Date/Time		4034153512	

STS DOV3EF MAP 4034153512

Figure 3.4.3.2.1-1. Pallet Status Record Sample Record**3.4.3.2.2. Pallet Status Message Business Rules/Constraints**

- After a pallet has reached CAP status, the Pallet Status message will be sent for each status change.
- The Pallet Status message will be sent to change a pallet status in MMHS when GATES is unable to use the data provided by MMHS in a Pallet Storage message; for example, when the pallet ID does not exist in GATES.

3.4.3.3. Mission Information Message (EU*-EID-036-05)

The Mission Information Message is sent from GATES to MMHS to provide information about missions outbound from the location.

3.4.3.3.1. Mission Information Record Format

The format of the Mission Information Record is shown in Table 3.4.3.3.1-1. Sample data is shown in Table 3.4.3.3.1-2 and a sample record is provided in Figure 3.4.3.3.1-1.

Table 3.4.3.3.1-1. Mission Information Record Format

Field Name	Pos	Len	Chks	Cat	L/R	Comments/Explanation/Algorithm
Transaction Type		3	A	M	MSN	"MSN" identifies this as a Mission Information Message.
Mission Number		12	X	M		12-character mission number for an outbound mission.
Aircraft Type		7	XS	O		This is the aircraft type assigned to the mission. It may be assigned locally or by GDSS.
Tail Number		5	X	O		This is the tail number of the aircraft assigned to the mission. It may be assigned locally or by GDSS.

Table 3.4.3.3.1-1. Mission Information Record Format

Field Name	Pos	Len	Chks	Cat	L/R	Comments/Explanation/Algorithm
Aircraft Parking Spot		5	X	O		This is the parking spot assigned to the aircraft.
Event Date/Time		10	N	M		The data and time the message was created in Zulu time using 24-hour clock. Use YJJJHHMMSS format where “Y” is the last digit of the calendar year; “JJJ” is the 3-digit Julian day of the year; “HH” is the 2-digit hour of the day; “MM” is the 2-digit minute of the hour; and “SS” is the 2-digit second of the minute.

Table 3.4.3.3.1-2. Mission Information Record Sample Data

Field Name	Pos	Sample Data	Database Mapping
Transaction Type		MSN	
Mission Number		1CB0900KC343	
Aircraft Type		MC130P	
Tail Number		60225	
Aircraft Parking Spot		5-28	
Event Date/Time		4034153515	

MSN 1CB0900KC343 MC130P 60225 5-28 4034153515

Figure 3.4.3.3.1-1. Mission Information Record Sample Record**3.4.3.3.2. Mission Information Message Business Rules/Constraints**

- GATES will send the Mission Information message each time a mission is assigned to a Chalk number.
- GATES will send the Mission Information message each time the Aircraft Type, Tail Number, or Aircraft Parking Spot for a mission that is assigned to a Chalk changes.
- GATES will retrieve the Tail Number and Aircraft Type from either GDSS provided data or locally input data and use whichever has the latest update.

3.4.3.4. Chalk Message (EU*-EID-036-06)

The Chalk Message is sent from GATES to MMHS to provide information about which pallets are assigned to which Chalk.

3.4.3.4.1. Chalk Record Format

The format of the Chalk Record is shown in Table 3.4.3.4.1-1. Sample data is shown in Table 3.4.3.4.1-2 and a sample record is provided in Figure 3.4.3.4.1-1.

Table 3.4.3.4.1-1. Chalk Record Format

Field Name	Pos	Len	Chks	Cat	L/R	Comments/Explanation/Algorithm
Transaction Type		3	A	M	CHK	“CHK” identifies this as a Chalk Message.
Chalk Number		6	N	M		6-digit identifier for a load planning Chalk.
Add/Delete Indicator		3	A	M	ADD, DEL	Indicates whether the Pallet is being added to or deleted from the given chalk.
Pallet ID		6	X	M		Pallet Identifier of the pallet.
Load Sequence Number		3	X	O		Provides the pallet position in which the pallet should be loaded on the aircraft.
Event Date/Time		10	N	M		The data and time the message was created in Zulu time using 24-hour clock. Use YJJJHHMMSS format where “Y” is the last digit of the calendar year; “JJJ” is the 3-digit Julian day of the year; “HH” is the 2-digit hour of the day; “MM” is the 2-digit minute of the hour; and “SS” is the 2-digit second of the minute.

Table 3.4.3.4.1-2. Chalk Record Sample Data

Field Name	Pos	Sample Data	Database Mapping
Transaction Type		CHK	
Chalk Number		132002	
Add/Delete Indicator		ADD	
Pallet ID		DOV3EF	
Load Sequence Number		06L	
Event Date/Time		4034153518	

CHK|132002|ADD|DOV3EF|06L|4034153518

Figure 3.4.3.4.1-1. Chalk Record Sample Record

3.4.3.4.2. Chalk Message Business Rules/Constraints

- GATES will send a Chalk Message for each pallet assigned to a Chalk when the Chalk is assigned to a mission.

- GATES will send the Chalk Message each time a pallet is added to or deleted from a Chalk that has been assigned to a mission.

3.4.3.5. Chalk Assign Message (EU*-EID-036-07)

The Chalk Assign Message is sent from GATES to MMHS to provide information about which chalk is assigned to which mission.

3.4.3.5.1. Chalk Assign Record Format

The format of the Chalk Assign Record is shown in Table 3.4.3.5.1-1. Sample data is shown in Table 3.4.3.5.1-2 and a sample record is provided in Figure 3.4.3.5.1-1.

Table 3.4.3.5.1-1. Chalk Assign Record Format

Field Name	Pos	Len	Chks	Cat	L/R	Comments/Explanation/Algorithm
Transaction Type		3	A	M	ASN	“ASN” identifies this as a Chalk Assign Message.
Chalk Number		6	N	M		6-digit identifier for a load planning Chalk.
Mission Number		12	X	M		12-character mission number for an outbound mission.
Event Date/Time		10	N	M		The data and time the message was created in Zulu time using 24-hour clock. Use YJJJHHMMSS format where “Y” is the last digit of the calendar year; “JJJ” is the 3-digit Julian day of the year; “HH” is the 2-digit hour of the day; “MM” is the 2-digit minute of the hour; and “SS” is the 2-digit second of the minute.

Table 3.4.3.5.1-2. Chalk Assign Record Sample Data

Field Name	Pos	Sample Data	Database Mapping
Transaction Type		ASN	
Chalk Number		132002	
Mission Number		1CB0900KC343	
Event Date/Time		4034153515	

ASN|132002|1CB0900KC343|4034153515

Figure 3.4.3.5.1-1. Chalk Assign Record Sample Record

3.4.3.5.2. Chalk Assign Message Business Rules/Constraints

- GATES will send the Chalk Assign Message each time a Chalk is assigned to a mission.

3.4.3.6. Truck Message (EU*-EID-036-08)

The Truck Message is sent from GATES to MMHS to provide information about which pallets are assigned to which outbound trucks.

3.4.3.6.1. Truck Record Format

The format of the Truck Record is shown in Table 3.4.3.6.1-1. Sample data is shown in Table 3.4.3.6.1-2 and a sample record is provided in Figure 3.4.3.6.1-1. There will be only one record of this type per file.

Table 3.4.3.6.1-1. Truck Record Format

Field Name	Pos	Len	Chks	Cat	L/R	Comments/Explanation/Algorithm
Transaction Type		3	A	M	TRK	“TRK” identifies this as a Truck Message.
Truck Number		7	N	M		7-digit identifier for an outbound truck.
Pallet ID		6	X	M		Pallet Identifier of the pallet.
Add/Delete Indicator		3	A	M	ADD, DEL	Indicates whether the Pallet is being added to or deleted from the given chalk.
Stop Number		3	N	M	002	Provides a sequence for the stops the given truck will make.
Event Date/Time		10	N	M		The data and time the message was created in Zulu time using 24-hour clock. Use YJJJHHMMSS format where “Y” is the last digit of the calendar year; “JJJ” is the 3-digit Julian day of the year; “HH” is the 2-digit hour of the day; “MM” is the 2-digit minute of the hour; and “SS” is the 2-digit second of the minute.

Table 3.4.3.6.1-2. Truck Record Sample Data

Field Name	Pos	Sample Data	Database Mapping
Transaction Type		TRK	
Truck Number		1320010	
Pallet ID		DOV3EF	
Add/Delete Indicator		DEL	
Stop Number		002	
Event Date/Time		4034153515	

TRK 1320010 DOV3EF DEL 002 4034153515

Figure 3.4.3.6.1-1. Truck Record Sample Record

3.4.3.6.2. Truck Message Business Rules/Constraints

- GATES will send the Truck Message each time a pallet is added to or deleted from a Truck.

3.5. GATES-MMHS Interface Communications (EU*-EID-036-16)

Approximately every minute, a transfer routine will be executed on the intermediary Windows PC. This routine will move files from the 'outbound' directory of each machine to the 'inbound' directory of the opposite machine. An account will be created on the GATES system to allow the transfers. The password will be provided through normal security channels and stored in a secure file.

3.6. Frequency and Estimated Volume

The following provides the frequency and approximate number of records transferred between GATES and MMHS by message type.

Table 3.5-1. Frequency and Estimated Volume

Message Type	In/Out	Frequency	Volume (Approx.)
Pallet Storage	In	As generated throughout the day; transmitted every minute.	100-200 records per day.
Pallet Frustrate	In	As generated throughout the day; transmitted every minute.	5-10 records per day.
Pallet Information	Out	As generated throughout the day; transmitted every minute.	100-200 records per day
Pallet Status	Out	As generated throughout the day; transmitted every minute.	20-30 records per day
Mission Information	Out	As generated throughout the day; transmitted every minute.	50-100 records per day
Chalk	Out	As generated throughout the day; transmitted every minute.	120-150 records per day
Chalk Assign	Out	As generated throughout the day; transmitted every minute.	20-25 records per day
Truck	Out	As generated throughout the day; transmitted every minute.	120-150 records per day

3.7. Priority

GATES has two types of priorities, Mission Critical and Administrative, of which Mission Critical is the highest priority. The MMHS data interchange with GATES is a Mission Critical Priority due to its use for quickly and accurately load planning aircraft.

3.8. Security

MMHS is designated as a sensitive but unclassified (SBU) system. The system administrator (SA) determines which users have access to the system. User identification is in the form of unit name, or other identification, and a password that is generated and verified by computer software routines. MMHS also includes edits and checks designed to minimize errors and loss of file data. The system provides notification of processing failures as they occur. Safeguards and control points are built into the system to ensure the integrity of data and database files. Both systems process Sensitive But Unclassified information. Procedures will remain consistent in both peace and wartime.

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4. QUALIFICATION PROVISIONS

Table 4-1 lists the MMHS interface requirements, the IDD project unique identifiers (PUIs), and the qualification method that will be used during testing to ensure the requirements have been met.

The qualification method will be Demonstration (D). The operation of this interface will be demonstrated by its observable operation and will not require the use of instrumentation, special test equipment. The details of the qualification are specified in the GATES STP and the test cases contained within the Rational test suite repository, which will be under Configuration Management control upon delivery.

Table 4-1. Qualification Method

IDD PUI	Requirement	Qualification Method
EU*-EID-036-01	Build Pallet Information Message	D
EU*-EID-036-02	Parse Pallet Frustrate Message	D
EU*-EID-036-03	Parse Pallet Storage Message	D
EU*-EID-036-04	Build Truck Message	D
EU*-EID-036-05	Build Chalk Message	D
EU*-EID-036-06	Build Chalk Assign Message	D
EU*-EID-036-07	Build Mission Info Message	D
EU*-EID-036-08	Build Pallet Status Message	D

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5. INTERFACE REQUIREMENTS TRACEABILITY

Traceability of the GATES interface requirements to the interface design and traceability of the interface design components to the GATES interface requirements are captured in the GATES requirements management tool, RequisitePro. The RequisitePro database is currently maintained on the contractor's network. For access to this information, contact the GATES Program Management Office (PMO).

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6. NOTES

6.1. Acronyms and Abbreviations

Below is a list of acronyms and abbreviations.

AACA	Army Airlift Clearance Authority
AALPS	Automated Air Load Planning System
ACA	Airlift Clearance Authority
ADANS	AMC Deployment Analysis System
AFB	Air Force Base
AFR	Air Force Regulation
ALOC	Air Lines of Communication
AMC	Air Mobility Command
ANSI	American National Standards Institute
APC	Aerial Port Code
APIS	Advanced Passenger Information System
APOD	Aerial Port of Debarkation
APOE	Aerial Port of Embarkation
ASCII	American Standard Code for Information Interchange
ASIF	Airlift Services Industrial Fund
ASIFICS	Airlift Services Industrial Fund Integrated Computer System
ASN	Advanced Shipping Notice
ATCMD	Advanced Transportation Control and Movement Document
ATOC	Air Terminal Operations Center
C2	Command and Control
C2IDD	Command and Control Interface Design Document
C2IPS	Command and Control Information Processing System
CBL	Commercial Bill of Lading
CCF	Consolidated Computer Facility
CDCP	Central Data Collection Point
CDRL	Contract Data Requirements List
CM	Configuration Management
CMOS	Cargo Movement Operations System
CONUS	Continental United States
COTS	Commercial Off-the-Shelf
CRQS	Channel Requirements Quota System
CSC	Computer Sciences Corporation
CSCI	Computer Software Configuration Item
CSS	Computer Systems Squadron
CTO	Commercial Transportation Office
CTUS	Custom Territories United States

D	Demonstration
DAAS	Defense Automatic Addressing System
DAASC	Defense Automatic Addressing System Center
DBDD	Database Design Description
DCA	Defense Communications Agency (now called Defense Information Systems Agency)
DEBX	Department of Defense (DoD) Electronic Business Exchange System
DeCA	Defense Commissary Agency
DECnet	Digital Equipment Corporation Network
DIC	Document Identification Code
DISA	Defense Information Systems Agency
DLA	Defense Logistics Agency
DNS	Domain Name Service
DoD	Department of Defense
DODAAC	Department of Defense Activity Address Code
DODIC	Department of Defense Identification Code
DOD-STD-2167A	Department of Defense Standard 2167A
DPS	Data Processing System
DS2T	Deployment and Sustainment Support Tool
DTR	Defense Transportation Regulation
DTS	Defense Transportation System
EOF	End of File
ETADS	Enhanced Transportation Automated Data System
FACTS	Financial and Air Clearance Transportation System
FH	File Header
FIPS	Federal Information Processing Standards
FM	Functional Manager
FTP	File Transfer Protocol
GATES	Global Air Transportation Execution System
GBL	Government Bill of Lading
GDSS	Global Decision Support System
GMT	Greenwich Mean Time
GTN	Global Transportation Network
HQ	Headquarters
IATA	International Air Transportation Association
ID	Identifier
IDD	Interface Design Description
IEEE	Institute of Electrical and Electronic Engineers
IL	Illinois
IMCO	International Munitions Compatibility Office

IP	Internet Protocol
IRS	Interface Requirements Specification
ITO	Installation Transportation Office
ITRAM	International Traffic Management System
ITV	In-Transit Visibility
JAD	Joint Application Development
LAN	Local Area Network
LIDB	Logistics Integrated Data Base
LIF	Logistics Intelligence File
LOGAIR	Logistics Airlift
LOGMOD	Logistics Module
LOGSA	Logistics Support Activity
LOTS	Logistics On-Line Tracking
MAN	Metropolitan Area Network
MANPER-B	Manpower and Personnel System – Base Level
MIL	Military
MILSTAMP	Military Standard Transportation and Movement Procedures
MIL-STD	Military Standard
MIL-STD-498	Military Standard 498
MILSTEP	Military Supply and Transportation Evaluation Program
MMHS	Mechanized Materials Handling System
MOA	Memorandum of Agreement
MOS	Military Occupational Specialty
MTMC	Military Traffic Management Command
MTO	Military Transportation Office
NAOMIS	Navy Material Transportation Office Operations and Management Information System
NEW	Net Explosive Weight
NSN	National Stock Number
OCONUS	Outside of the Continental United States
OPR	Office of Primary Responsibility
OO	Object-Oriented
PC	Personal Computer
PMO	Program Management Office
PNR	Passenger Name Record
POD	Port of Debarkation
POE	Port of Embarkation
PRAMS	Passenger Reservation and Manifesting System
PRC	Passenger Reservation Center

PTO	Passenger Transportation Office
PUI	Project Unique Identifier
RCAPS	Remote Consolidated Aerial Port System
RDD	Required Delivery Date
RFID	Radio Frequency Identification
SDD	Software Design Description
SDP	Software Development Plan
SH	Segment Header
SRS	Software Requirements Specification
SSA	Supply Support Activity
SSDD	System/Subsystem Design Description
SSS	System/Subsystem Specification
STD	Standard
STP	Software Test Plan
TAC	Transportation Account Code
TACC	Tanker Airlift Control Center
TC ACCIS	Transportation Coordinator Automated Command and Control Information System
TC-AIMS II	Transportation Coordinators' Automated Information for Movement System II
TCI	TRI-COR Industries
TCMD	Transportation Control And Movement Document
TCN	Transportation Control Number
TCP	Transmission Control Protocol
TDS	Tabular Data Stream
TELNET	Telecommunications Network
TMDS	Table Management Distribution System
TMO	Traffic Management Office
TRAC2ES	TRANSCOM Regulating and Command and Control Evacuation System
ULN	Unit Line Number
URL	Uniform Resource Locator
US	United States
USAF	United States Air Force
USMTF	United States Message Text Format
USTRANSCOM	United States Transportation Command
VPN	Virtual Private Network
WSMIS	Weapon System Management Information System

6.2. Glossary

This is a list of terms and corresponding definitions pertaining to GATES.

Aerial Port	An airfield designated for sustained air movement of personnel and materiel to serve as an authorized port for entrance or departure to or from the country where located.
Aerial Port of Debarkation (APOD)	An aerial port serving as an authorized port to process and clear aircraft and traffic for entrance to the country where located.
Aerial Port of Embarkation (APOE)	An aerial port serving as an authorized port to process and clear aircraft and traffic for departure from the country where located.
Air Cargo	Stores, equipment or vehicles, which do not form part of the aircraft, and are considered its payload.
Air Mobility Command (AMC)	AMC is the airlift component command of USTRANSCOM.
Air Movement	Air transport of units, personnel, supplies, and equipment including airdrops and air landings.
Air Terminal	A facility on an airfield that functions as an air transportation hub and accommodates the loading and unloading of aircraft and the intransit processing of traffic. The airfield may or may not be designated an aerial port.
Aircraft	This entity describes the characteristics of an individual aircraft. The aircraft is identified by its tail number.
American National Standards Institute (ANSI)	This organization is responsible for approving U.S. standards in many areas, including computers and communications. Standards approved by this organization are often called ANSI standards (e.g., ANSI C is the version of the C language approved by ANSI).
Carrier	Any individual, company, or corporation commercially engaged in transporting cargo or passengers.
Category A	Transportation of passengers or cargo in less than plane load lots on a carrier's regularly scheduled commercial flight. AMC pays the carrier through direct billing to AMC.

Category B	Transportation of passengers and/or cargo in full planeload lots on other than carrier's regularly scheduled commercial flights. Payment to carrier via contract with AMC.
Category M	Movement of passengers on military passenger or cargo/passenger-configured aircraft. Flights normally operate between military airports. Passengers are booked by AMC passenger booking activities. Passengers use travel orders with a control number applied by the Traffic Management Offices (TMOs)/Installation Transportation Offices (ITOs)/Passenger Transportation Offices (PTOs), as travel authorization.
Computer Software Configuration Item (CSCI)	An aggregation of computer software that satisfies an end-use function and is designed for separate configuration management.
Custom Territories United States (CTUS)	The Custom Territories are the 50 United States, the District of Columbia, and Puerto Rico.
Data Element	A basic unit of information having a unique meaning and subcategories (data items) of distinct units or values. Examples of data elements are military personnel grade, sex, race, geographic locations, and military unit.
Demonstration	The operation of the system, or a part of the system, that relies on observable functional operation not requiring the use of instrumentation, special test equipment, or subsequent analysis.
File Transfer	The copying of a file from one computer to another over a computer network.
File Transfer Protocol (FTP)	A protocol which allows a user on one host to access, and transfer files to and from, another host over a network. Also, FTP is usually the name of the program the user invokes to execute the protocol.
Guaranteed Traffic	A transportation arrangement by which a primary carrier or carriers are selected to transport specified DoD traffic for a designated time period.
Institute of Electronics and Electrical Engineers (IEEE)	A standards-setting body that specifies data communications standards.

Interface Design Description (IDD)	The IDD specifies the detailed design for one or more interfaces between one or more Computer Software Configuration Items (CSCIs) and other configuration items or critical items. The IDD and its companion Interface Requirements Specification (IRS) serve to communicate and control interface design decisions to the Government. Upon completion of Physical Configuration Audit (PCA), the IDD becomes a part of the Product Baseline. The IDD is used by the contractor as the basis for software design of the interface(s) and is used by the Government to assess the design of the interfaces documented in the IRS.
Interface Requirements Specification (IRS)	The IRS specifies the requirements for one or more interfaces between one or more CSCIs and other configuration items or critical items. It also specifies the requirements for the interface(s) and enables the Government to assess whether the implementation of the interface(s) complies with those requirements. Upon Government approval and authentication, the IRS becomes the joint configuration control device for the interface(s) and becomes part of the Allocated Baseline. The IRS is used by the contractor(s) as the basis for development of the interface(s).
Interface	The functional and physical characteristics required to exist at a common boundary.
Internet	While an internet is a network, the term "internet" is usually used to refer to a collection of networks interconnected with routers.
Internet address	An IP address that uniquely identifies a node on an internet.
Internet Protocol (IP)	The network layer for the Transmission Control Protocol (TCP)/IP Protocol Suite. It is a connectionless, best-effort packet switching protocol.
IP address	The 32-bit address defined by the Internet Protocol. It is usually represented in dotted decimal notation.
Itinerary	This entity describes the sequential routing stops that are transited by a conveyance in transporting a movement requirement.
Julian Date	A three-digit number representing the accumulated day of the calendar year (DDD, JAN 1 = 001). Often augmented with the associated year (e.g., YDDD, YYDDD, or YYYYDDD).

L-Band	L-Band SATCOM provides aircrews and C2 ground stations a worldwide communications capability suitable for unclassified C2. Messages can be sent air-to-air, air-to-ground, or ground-to-ground.
Local Area Network (LAN)	A data network intended to serve an area of only a few square kilometers or less. Because the network is known to cover only a small area, optimization can be made in the network signal protocols that permit data rates up to 100Mb/s.
Manifest	A manifest is the documentation of the discrete shipment unit(s) of personnel and/or cargo traveling between the same on load and off load points aboard a specific conveyance.
Metropolitan Area Network (MAN)	A data network intended to serve an area approximating that of a large city. Such networks are being implemented by innovative techniques, such as running fiber cables through subway tunnels.
Military Transportation Office	This is general term for the following offices: ITOs, PTOs, CTOs, and TMOs.
Mission Number	A code assigned to a specific mission, using up to seven alphanumeric characters.
Mission Type	This entity describes the categories into which missions or voyages can be separated.
Network	A computer network is a data communications system, which interconnects computer systems at different sites.
Network Address	The network portion of an IP address. For a class A network, the network address is the first byte of the IP address. For a class B network, the network address is the first two bytes of the IP address. For a class C network, the network address is the first three bytes of the IP address. In each case, the remainder is the host address. In the Internet, assigned network addresses are globally unique.
On-hand	Items located at the aerial port.
Password	A protected word or string of characters that identifies or authenticates a user for access to a specific system, data set, file, record, and so forth.
PIPELINE	PIPELINE is a key sub-system of the Logistic Integrated Data Base (LIDB) that replaced the LIF and Materiel Returns Data Base

Session	A communications connection between two nodes.
Subnet Address	The subnet portion of an IP address. In a subnetted network, the host portion of an IP address is split into a subnet portion and a host portion using an address (subnet) mask.
TCP/IP Protocol Suite	Transmission Control Protocol over Internet Protocol. This is common shorthand that refers to the suite of transport and application protocols that run over IP.
TELNET	TELNET is the Internet standard protocol for remote terminal connection service.
TRACKER	TRACKER provides comprehensive supply, transportation, acquisition, and maintenance information to support the various functions of the Logistics Support Office with the primary focus being pipeline performance analysis and transportation billing validation
Voluntary Traffic	A voluntary submission of a tender, traffic that is not guaranteed.

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7. INTERFACE MODIFICATION PROCEDURES

Refer to the GATES-MMHS Interface Memorandum of Agreement (MOA) for specific procedures for modifying this interface.

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SPACE REQUIREMENTS SUMMARY
NEW AIR FREIGHT TERMINAL, DOVER AIR FORCE BASE

Revised January 28, 2004

Page A-2

AMENDMENT 0016

SPACE DESCRIPTION	NET AREA (SF)	ACTIVITY GROSS AREA (SF)	TOTAL GROSS AREA (SF)	REMARKS
C. <u>Special Handling Area</u>	21140	43000		Area for storing, palletizing and shipping hazardous cargo which cannot be processed in Import/Export Processing Bays
1. Offices	1200			Locate on Mezzanine. CSB, Training and Dispatch Areas shall be in (1) Open Office.
- (1) Supervisor, E7	100			
- (1) Supervisor, WS8	100			
- (1) Supervisor, Ops. NCO, E5-E6	150			
- (1) CSB Area with (2) workstations	150			
- (1) Training Area	300			Space for desk and small table with (6) chairs.
- (1) Dispatch Area	200			Space for (1) desk, charging station for radios, (2) computer workstations, status and safety boards.
Unisex Toilet	35			
Circulation	165			
2. Multiple special storage & security bays.				Provide 18 feet height clearance. No blast requirements. Max qty of HAZMAT per applicable building code.
(1) Storage of Class 2 (gas) materials	2400			
(1) Storage of Class 3 (flammable liquids) materials	2400			
(1) Storage of Class 4 (flammable solids), 5 (oxidizers) and 7 (radioactive) materials	2400			
(1) Storage of Class 8 (liquid & solid corrosives) materials	2400			
(1) Storage of Class 6 (liquid & gas poisons) and 9 (micellaneous) materials	2400			
3. Security Cage	5000			Cmu walls
4. Mechanical Room	540			Direct outside access.
5. Mail Area	600			Locate under office mezzanine with MICAP. Provide chain link fencing with lockable swing gate. Gate shall be wide enough for a 4K fork lift. Provide 12'-0" height min. clearance, or height for fork lift, whichever is greater.
6. MICAP Area	600			Area for high priority mail. Locate under office mezzanine with Mail Area. Provide chain link fencing with lockable swing gate. Gate shall be wide enough for a 4K fork lift. Provide 12'-0" height min. clearance, or height for fork lift, whichever is greater.
D. <u>Freight Transfer Facility</u>	4126	4200		Locate near Outsized Cargo Facility.

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SPACE DESCRIPTION	MECHANICAL REMARKS
I. <u>Terminal Building</u>	
A. <u>Cargo Processing Bays</u>	
1. Import Area	Heating: Yes Cooling: No Carbon Monoxide Detection System: Yes Ventilation Air: (1) air change
2. Export Area	Heating: Yes Cooling: No Carbon Monoxide Detection System: Yes Ventilation Air: (1) air change
3. Refrigerated Storage Area	
4. Mechanical Room	Heating: Yes Cooling: No Ventilation Air: Yes (.50 cfm per sq. ft.)
5. Fire Pump Rooms	Heating: Yes Cooling: No Ventilation Air: Yes (.50 cfm per sq. ft.)
6. Electrical Room	Heating: No Cooling: Yes (85 degrees F max.)
7. Packing & Crating ((2) air changes) (1) Office (1) Office (1) Caged Area	Heating: Yes Cooling: Yes (no cooling for caged area) Outside Air: 20 cfm per person Ventilation Air: Yes
8. Recoop Shop	Heating: Yes Cooling: No Ventilation Air: Yes Dust Collection System: Yes - 8 locations for woodworking equipment
9. Office for (3) Workstations	Heating: Yes

SPACE DESCRIPTION	MECHANICAL REMARKS
B. <u>Covered Storage Area</u>	Cooling: Yes (no cooling for caged area) Outside Air: 20 cfm per person
1. Covered Staging Docks	Heating: No Cooling: No
2. (4) Level Pallet Storage	Heating: No Cooling: No Ventilation Air: (4) (4) air changes. Maintain space temperature no more than 10 degrees F above outside air temperature in summer.C583
3. ALOC/Code "J" Dock	Heating: No Cooling: No
4. (2) Level Multi-pallet Train Storage System	Heating: No Cooling: No Ventilation Air: (1) air change
C. <u>Special Handling</u>	
1. Offices	
-(1) Supervisor, E7	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person
-(1) Supervisor, WS8	Heating: Yes Cooling: Yes

SPACE DESCRIPTION	MECHANICAL REMARKS
	Outside Air: 20 cfm per person
-(1) Supervisor, Ops. NCO, E5-E6	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person
-(1) CSB Area with (2) workstations	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person
-(1) Training Area	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person
-(1) Dispatch Area	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person
Unisex Toilet	Heating: Yes Cooling: Yes Exhaust Air: 75 cfm per water closet or urinal
Circulation	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person

SPACE DESCRIPTION	MECHANICAL REMARKS
2. Multiple special storage & security bays.	
(1) Storage of Class 2 (gas) materials	Heating: No Cooling: No Ventilation Air: No Emergency Exhaust: 1 cfm per sq. ft. min.
(1) Storage of Class 3 (flammable liquids) materials	Heating: No Cooling: No Ventilation Air: No Emergency Exhaust: 1 cfm per sq. ft. min.
(1) Storage of Class 4 (flammable solids), 5 (oxidizers) and 7 (radioactive) materials	Heating: No Cooling: No Ventilation Air: No
(1) Storage of Class 8 (liquid & solid corrosives) materials	Heating: No Cooling: No Ventilation Air: No Emergency Exhaust: 1 cfm per sq. ft. min.
(1) Storage of Class 6 (liquid & gas poisons) and 9 (micellaneous) materials	Heating: No Cooling: No Ventilation Air: No Emergency Exhaust: 1 cfm per sq. ft. min.
3. Security Cage	Heating: Yes Cooling: No Security Bars: Grilles and ductwork
4. Mechanical Room	Heating: Yes Cooling: No Ventilation Air: Yes (.50 cfm per sq. ft.)

SPACE DESCRIPTION	MECHANICAL REMARKS
5. Mail Room (dedicated air system)	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person Provide emergency stop button control (for Anthrax)
6. MICAP Area	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person Provide emergency stop button control (for Anthrax)
D. <u>Freight Transfer Facility</u>	
1. Customer Service Vestibule	Heating: Yes Cooling: Yes
2. (1) Office with (2) computer workstations E7 and Civilian	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person
3. Bunk Area	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person
4. Toilet and Shower	Heating: Yes Cooling: Yes Exhaust Air: 75 cfm per water closet or urinal, 6 air changes in shower
5. Break Room	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person

SPACE DESCRIPTION	MECHANICAL REMARKS
6. Security Storage	Heating: Yes Cooling: No Ventilation Air: Yes (.50 cfm per sq. ft.) Security Bars: Grilles and ductwork
7. Crypto	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person
E. <u>Cargo Deployment Facility</u>	
1. Office Area	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person
2. Toilet Room	Heating: Yes Cooling: Yes Exhaust Air: 75 cfm per water closet or urinal
3. Mechanical Room	Heating: Yes Cooling: No Ventilation Air: Yes (.50 cfm per sq. ft.)
4. Fire Pump Room	Heating: Yes Cooling: No Ventilation Air: Yes (.50 cfm per sq. ft.)
5. Electrical Room	Heating: No Cooling: Yes (85 degrees F max.)

SPACE DESCRIPTION	MECHANICAL REMARKS
F. <u>Ramp Services</u>	
1. Ramp Operations Offices -(1) Supervisor, E7 -(1) Supervisor, E6 -(1) Training Office, E6	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person
2. Loading Crew Dispatch Office	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person
3. Break Room	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person
4. Locker Room	Heating: Yes Cooling: Yes Ventilation Air: (.50 cfm per sq. ft.) (min.)
5. Toilets	Heating: Yes Cooling: Yes Ventilation Air: 75 cfm per water closet or urinal
6. Storage	Heating: Yes Cooling: No Ventilation: (.15 cfm per sq. ft.) (min.)
7. Mechanical Room	Heating: Yes Cooling: No Ventilation Air: Yes (.50 cfm per sq. ft.)

SPACE DESCRIPTION	MECHANICAL REMARKS
8. Electrical Room	Heating: No Cooling: Yes (85 degrees F max.) Ventilation Air: Yes
9. Communications Room	Heating: Yes Cooling: Yes 24 hrs/7 days a week Provide positive pressure
G. <u>Vehicle Dispatch Area</u>	
1. (1) Administrative office with (2) workstations	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person
2. (1) Supply Area	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person
H. <u>Mechanized Material Handling System (MMHS) Shop</u>	
1. (1) Supervisory Office, WS9	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person
2. Shop Area	Heating: Yes Cooling: Yes Ventilation Air: Yes Exhaust Air: Welding fume exhaust systems and dust collection systems in shop area - four welding locations.
3. Break Room	Heating: Yes Cooling: Yes Outside Air: 20 cfm per person
I. <u>Boiler Room</u>	Heating: Yes

SPACE DESCRIPTION	ELECTRICAL SPACE REQUIREMENTS		
	LIGHTING AND SURVEILLANCE	POWER	COMMUNICATIONS
1. Covered Staging Docks	General Illumination: High bay luminaires with a minimum of 30FC at the floor.	No receptacle necessary.	
2. (4) Level Pallet Storage	General Illumination: High bay luminaires with a minimum of 30FC at the floor.	Convenient receptacle near every door.	Provide separate data communications network from ETV to the electronics shop in the MMHS.
3. ALOC/Code "J" Dock	General Illumination: High bay luminaires with a minimum of 30FC at the floor. Surveillance: pan-tilt-zoom for total coverage.	Convenient receptacles - one double duplex every 20 feet of wall space. Computer receptacles - one double duplex near each conveyor.	
4. Outsized Cargo Facility, with (2) Level Multi-pallet Train Storage System	Storage System: Metal Halide high bay luminaires with a minimum of 30FC at the floor. Open Cargo Area: Metal halide high bay luminaires with a minimum of 30 FC at the floor. Landside: One dock light per loading dock door. Surveillance (open cargo area): pan-tilt-zoom CCTV cameras for entire coverage.	Convenient receptacles - one double duplex every 20 feet of wall space. Computer receptacles - one double duplex near each conveyor.	Provide separate data communication network from the ETV to the electronics shop the MMHS.

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